Vol. 9, No. 16
August 31, 1984

Energy Research Abstracts

Abstracts 30096-32440

Technical Information Center
Office of Scientific & Technical Information
UNITED STATES DEPARTMENT OF ENERGY

CURRENT AWARENESS PUBLICATIONS ON ENERGY

To provide complete coverage of literature related to major Department programs, announcement publications that are comprehensive in their coverage of certain energy fields are issued regularly. All information in these publications, plus additional backup information, is included in the Energy Data Base of the Technical Information Center; all references are also available for machine searching via the on-line retrieval system, DOE/RECON, and the commercial on-line retrieval systems. Descriptions of these current awareness publications, which are supported either directly or indirectly by the DOE, appear below. Department of Energy components may receive the listed publications free from the Technical Information Center, Office of Scientific and Technical Information, P. O. Box 62, Oak Ridge, TN 37831. Telephone (615) 576-1301; FTS 626-1301.

PUBLICATIONS OF THE TECHNICAL INFORMATION CENTER

Energy Abstracts for Policy Analysis (EAPA)

A monthly abstract journal devoted to the analysis of energy research, conservation, and policy. Scope and coverage are limited to substantive articles or reports and emphasize the following programmatic efforts; legislative, regulatory, and other legal aspects; social, economic, and environmental impacts; regional and sectoral analyses; institutional factors, etc. *EAPA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402; domestic subscribers $5.00, foreign $6.25 per copy; annual cumulative index, domestic $16.00, foreign $20.00 per copy. The annual subscription price is $72.00 for domestic subscribers and $90.00 for foreign subscribers.

Energy Research Abstracts (ERA)

A comprehensive semimonthly abstract journal devoted to all areas of energy-related information produced by the Department of Energy, other U. S. government organizations, and foreign governments. *ERA* is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign).

DOE Patents Available for Licensing (PAL)

DOE is prepared to grant exclusive or nonexclusive, revocable licenses under DOE-owned U. S. patents and patent applications; this semiannual publication provides abstracting and indexing coverage of this literature. *PAL* is available on subscription as PB84-946800 from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. The annual subscription price is $14.00 for domestic subscribers and $28.00 for subscribers outside the North American continent; prices for single issues are $7.00 and $14.00, respectively.

The following monthly update journals are available to the public on subscription from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; use the identifying order number (PB- No.) when subscribing. The annual subscription rate for one volume (calendar) year (12 issues plus cumulative index) is $75.00 for domestic (North America) and $150.00 for foreign (outside North America) subscribers. A single issue is $7.00 (domestic) and $14.00 (foreign).

***Current Energy Patents (CEP)*–PB84-902800**

Provides coverage of the international patent literature, including patent applications, that concerns any aspect of energy production, conservation, and utilization.

***Energy and the Environment (EAE)*–PB84-914900**

Devoted to information on the impacts of energy-related activities and radioactive and nonradioactive pollutants on the environment.

***Fossil Energy Update (FEU)*–PB84-914600**

Devoted to information on the exploration, development, processing, and use of fossil fuels.

***Fusion Energy Update (CFU)*–PB84-915300**

Devoted to information on controlled thermonuclear fusion, including plasma and fuel research and power plant engineering and conceptual design studies.

***Solar Energy Update (SEU)*–PB84-914500**

Devoted to information on the utilization of solar energy, including biomass and tidal and wind power.

The following semimonthly bulletins are also available from the National Technical Information Service. The annual subscription rate for one volume (calendar) year (24 issues; no indexes) is $40.00 for domestic subscribers and $80.00 for subscribers outside the North American continent; use the identifying order number (PB- No.) when subscribing.

***Acid Precipitation (APC)*–PB84-901000**

Covers all aspects of acid precipitation, including effects and possible control measures.

***Coal-Based Synfuels (CBS)*–PB84-901400**

Covers all aspects of conversion of coal into gaseous or liquid fuels.

***Coal Preparation and Pollution Control (CPC)*–PB84-900800**

Covers all aspects of coal preparation and cleaning and reducing pollution from its direct combustion.

***Direct Energy Conversion (DEC)*–PB84-946600**

Covers the following areas: photovoltaics, magnetohydrodynamics, electrohydrodynamics, thermoelectrics, thermionics, and fuel cells.

***Geothermal Energy Technology (GET)*–PB84-914700**

Devoted to information on the exploration, development, and utilization of geothermal resources.

***Laser Research (LAR)*–PB84-901100**

Covers all aspects of laser research and development, but excludes applications.

***Nuclear Fuel Cycle (NFC)*–PB84-913400**

Covers all aspects of the nuclear fuel cycle, both front end and back end.

***Nuclear Reactor Safety (NRS)*–PB84-913500**

Covers the following safety aspects: accident analysis, safety systems, radiation protection, decommissioning and dismantling, and security measures.

***Radioactive Waste Management (RWM)*–PB84-902900**

Covers the following management aspects: transport and storage, waste processing, waste disposal, waste storage, radioactive effluents, and shipping containers.

***Solar Thermal Energy Technology (STT)*–PB84-901200**

Covers research in materials, concentrators/receivers, salinity gradients, etc., for development of efficient and reliable solar thermal conversion systems.

***Unconventional Petroleum (UCP)*–PB84-901300**

Covers all aspects of secondary and tertiary recovery of petroleum and of oil shales and tar sands.

INTERNATIONAL ENERGY PUBLICATIONS

The Office of Scientific and Technical Information, Technical Information Center (TIC) cooperates with the following organizations in the publication of international abstract journals: (1) International Atomic Energy Agency, International Nuclear Information System, Vienna, Austria, for *Atomindex;* (2) International Energy Agency, IEA Coal Research, London, England, for *Coal Abstracts;* and (3) International Energy Agency, Biomass Conversion Technical Information Service, Dublin, Ireland, for *Biomass Abstracts.* In each case, the cognizant foreign agency provides the non-U.S. information to TIC for inclusion in the Energy Data Base; in turn, TIC provides the U. S. information for input into the respective journal.

Atomindex

A semimonthly abstract journal providing worldwide coverage of information on nuclear science and technology. *Atomindex* is available by subscription from UNIPUB, 345 Park Avenue South, New York, NY 10010. The cost of an annual subscription, 24 semimonthly issues and semiannual and annual cumulative indexes, is $290.

Biomass Abstracts

A bimonthly abstract journal with comprehensive coverage of information in any step involved in the eventual conversion of biomass to energy. *Biomass Abstracts* is available free to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Biomass Abstracts* from Biomass Conversion Technical Information Service, Institute for Industrial Research and Standards, Ballymun Road, Dublin 9, Ireland, for 42 IR pounds per year. Make checks payable to the Institute.

Coal Abstracts

A monthly abstract journal providing comprehensive worldwide coverage of information in the field of coal science and technology. *Coal Abstracts* is available to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Coal Abstracts* from IEA Coal Research, Technical Information Service, 14-15 Lower Grosvenor Place, London SW1W 0EX, England, for 100 pounds sterling per year.

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Vol. 9, No. 16
ISSN: 0160-3604
CODEN: ERABD
August 31, 1984

ENERGY RESEARCH ABSTRACTS

ABOUT THE TECHNICAL INFORMATION CENTER

The Office of Scientific and Technical Information, Technical Information Center in Oak Ridge, Tennessee, has been the national center for scientific and technical information for the Department of Energy (DOE) and its predecessor agencies since 1946. In developing and managing DOE's technical information program, the Center places under bibliographic control not only DOE-originated information but also worldwide literature on scientific and technical advances in the energy field and announces the source and availability of this information. Whereas the literature of science is emphasized, coverage is extended to DOE programmatic, socioeconomic, environmental, legislative/regulatory, energy analysis, and policy-related areas. To accomplish this mission, the Center builds and maintains computerized energy-information data bases and disseminates this information via computerized retrieval systems and announcement publications such as abstracting journals, bibliographies, and update journals. Direct access to the Center's most comprehensive data base, the Energy Data Base, is available to the public through commercial on-line bibliographic retrieval systems. The Energy Data Base and many of the Center's energy-related data bases are available to DOE offices and contractors and to other government agencies via DOE/RECON, the Department's on-line information retrieval system. The Center has developed and maintains systems to record and communicate energy-related research-in-progress information, to maintain a register of DOE public communications publications, to track research report deliverables from DOE contractors, and to test and make available DOE-funded computer software programs with scientific and management applications. The Center also maintains a full-scale publishing capability to serve special publication needs of the Department. To effectively manage DOE's technical information resources, the Center's program is one of continual development and evaluation of new information products, systems, and technologies.

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ABOUT *ENERGY RESEARCH ABSTRACTS*

Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs originated by the U. S. Department of Energy, its laboratories, energy centers and contractors. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations. The user should remain aware that *ERA* coverage of non-report literature is limited to that generated by Department of Energy activity.

ERA is comprehensive in its subject scope, encompassing the DOE's research, development, demonstration, and technological programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

ERA is available on an exchange basis to universities, research institutions, industrial firms, and publishers of scientific information. Inquiries should be directed to the Office of Scientific and Technical Information, Technical Information Center, P. O. Box 62, Oak Ridge, TN 37831.

ERA is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign). The cumulative indexes will be available in printed form from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, and in microfiche form from the National Technical Information Service, U. S. Department of Commerce, Springfield, VA 22161, and from Engineered Systems, P. O. Box 866, Oak Ridge, TN 37831.

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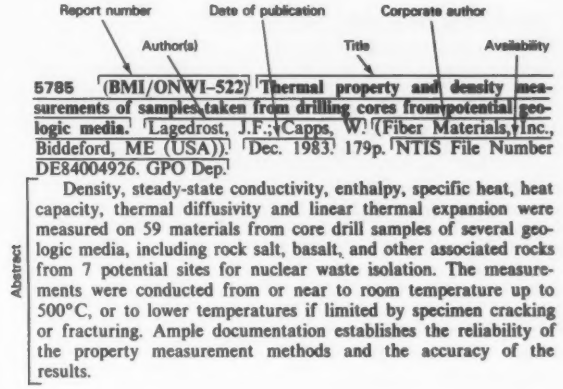
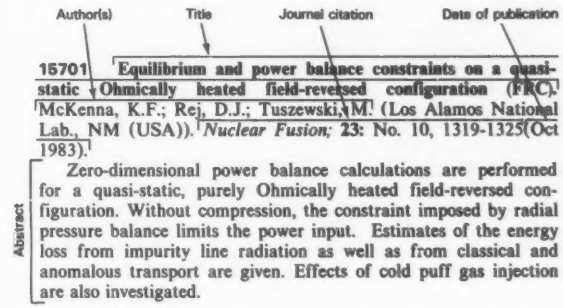
HOW TO USE *ENERGY RESEARCH ABSTRACTS*

ABSTRACTS IN *ENERGY RESEARCH ABSTRACTS*

The principal elements of abstract entries for a typical research and development report and a typical technical journal article are illustrated below.


Report number
Date of publication
Corporate author
Author(s)
Title
Availability
5785 (BMI/ONWI-522) Thermal property and density measurements of samples taken from drilling cores from potential geologic media. Lagedrost, J.F.; Capps, W. (Fiber Materials, Inc., Biddeford, ME (USA)). Dec. 1983. 179p. NTIS File Number DE84004926. GPO Dep.
Abstract
Density, steady-state conductivity, enthalpy, specific heat, heat capacity, thermal diffusivity and linear thermal expansion were measured on 59 materials from core drill samples of several geologic media, including rock salt, basalt, and other associated rocks from 7 potential sites for nuclear waste isolation. The measurements were conducted from or near to room temperature up to 500°C, or to lower temperatures if limited by specimen cracking or fracturing. Ample documentation establishes the reliability of the property measurement methods and the accuracy of the results.


Author(s)
Title
Journal citation
Date of publication
15701 Equilibrium and power balance constraints on a quasi-static Ohmically heated field-reversed configuration (FRC). McKenna, K.F.; Rej, D.J.; Tuszewski, M. (Los Alamos National Lab., NM (USA)). Nuclear Fusion; 23: No. 10, 1319-1325 (Oct 1983).
Abstract
Zero-dimensional power balance calculations are performed for a quasi-static, purely Ohmically heated field-reversed configuration. Without compression, the constraint imposed by radial pressure balance limits the power input. Estimates of the energy loss from impurity line radiation as well as from classical and anomalous transport are given. Effects of cold puff gas injection are also investigated.

INDEXES TO *ENERGY RESEARCH ABSTRACTS*

Five indexes are provided for approaching the contents of each issue of *Energy Research Abstracts (ERA)*. Each index is preceded by an introduction that details the organization of the index and the principles by which it was compiled. The reader is referred to these introductions for information not found in the index examples that follow.

• Corporate Author Index

Technical report literature is indexed using the name of the organization or institution responsible for the issuance of the report.

5785 (BMI/ONWI-522) **Thermal property and density measurements of samples taken from drilling cores from potential geologic media.** Lagedrost, J.F.; Capps, W. **(Fiber Materials, Inc., Biddeford, ME (USA)).** Dec. 1983. 179p. NTIS File Number DE84004926. GPO Dep.

is indexed as:

Fiber Materials, Inc., Biddeford, ME (USA)

• Personal Author Index

Each author's name is indexed in the form appearing on the document abstracted, with the exception that given names are reduced to initials:

Capps, W., *See* Lagedrost, J. F.
Lagedrost, J.F., Thermal property and density measurements of samples taken from drilling cores from potential geologic media, 9:5785 (R:US)
McKenna, K.F., Equilibrium and power balance constraints on a quasi-static Ohmically heated field-reversed configuration (FRC), 9:15701 (J:US)
Rej, D.J., *See* McKenna, K.F.
Tuszewski, M., *See* McKenna, K.F.

• Subject Index

The subject index consisting of entries naming specific materials, objects, and processes is arranged alphabetically. Document titles, informative phrases, or both specific to these entries are arranged alphabetically under the entries.

SALT DEPOSITS
Density
Thermal property and density measurements of samples taken from drilling cores from potential geologic media, 9:5785 (R;US)
REVERSED-FIELD PINCH
Energy Balance
Equilibrium and power balance constraints on a quasi-static Ohmically heated field-reversed configuration (FRC), 9: 15701 (J;AT)

• Contract Number Index

DOE technical report literature is indexed using contract numbers. This index contains the contract number with corresponding abstract and report numbers.

AC06-76RL01830 **Fiber Materials, Inc., Biddeford, ME (USA)** 9:5785 BMI/ONWI-522

• Report Number Index

Technical report literature is also indexed using report numbers. This index includes information on where individual reports may be obtained. Patents and conference papers are indexed here as a matter of convenience. When a report is supplied under a File Number, that number is included in the availability statement. A File Number–Report Number Correlation is included for convenience.

BMI/ONWI-522 9:5785 **NTIS, PC A09/MF A01. File Number DE84004926, Distribution Category MN-70**

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SUBJECT CONTENTS (NUMERICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 293 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope definitions and limitations is available as DOE/TIC-4584-R5 from NTIS for $9.50.

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Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 293 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope definitions and limitations is available as DOE/TIC-4584-R5 from NTIS for $9.50.

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ENERGY RESEARCH ABSTRACTS

01 COAL AND COAL PRODUCTS

30095 **(DOE/ET/10491—T1) Advanced research and technoloty: University Coal Research Program.** (Energy and Environmental Analysis, Inc., Arlington, VA (USA)). Aug 1980. Contract AC01-76ET10491. 47p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012821.

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In October 1979, Congress provided a new budget line item of $5 million for a program open to universities with existing laboratories capable of performing coal research. In response, the Department of Energy developed a national and regional program focused on university work in coal conversion and utilization. The program emphasizes coal combustion, conversion of coal to synthetic oil and gases, and characterization of coals from various regions of the country, and encourages the investigation and development of pertinent, promising, or novel ideas for advancing our knowledge of coal science. The program was announced to the academic community in December 1979, inviting more than 2000 departments of chemistry, chemical engineering, and mechanical engineering as well as academic vice-presidents for research, and university faculty to submit coal research proposals. By March 1980, more than 500 proposals had been received for consideration. By June 1980, after technical review of the proposals, 41 grants were awarded to 33 universities in 24 states. Each of these projects is described by means of a single-page summary that includes pertinent technical and fiscal information. The University Coal Research Program complements other DOE Fossil Energy activities with universities consisting of more than 400 active projects with an annual funding level of about $42 million. However, the new program differs in several respects: (1) it is performed through grants, rather than contracts or cooperative agreements, thereby offering investigators greater leeway in approaches to performance of their research objectives, (2) although mission oriented, it supports somewhat longer-term and more fundamental projects, and (3) it includes the training of students as an important objective.

30097 **(DOE/FE/60181—90) Lignite research in North Dakota.** Wiltsee, G.A. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Apr 1984. Contract FC21-83FE60181. 8p. (CONF-8404159—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011559.

From North Dakota's Industrial Climate conference; Grand Forks, ND, USA (26 Apr 1984).

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Lignite research programs in North Dakota are presently funded at about $11 million per year - mostly by federal funds to the North Dakota Energy Research Center and the Mining and Mineral Resources Research Center. Recommendations for broader research programs are given. (L.T.N)

0104 Processing

REFER ALSO TO CITATION(S) 30163, 30169, 30180, 30181, 30267, 30443, 30457, 30458, 30459, 30460, 30462, 30463, 30748, 31098, 31319

30098 **(BMFT-FB-T—83-320) Prototype plant for nuclear process heat (PNP), reference phase. R+D-work on hydrogasification of coal (HKV).** Gerigk, H.P.; Langer, H.; Schrader, L.; Schumacher, H.J. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 69p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84751250.

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Processes for coal gasification are well known and proved for a long time past. The coal gasification processes using nuclear process heat, however, being developed within the framework of the PNP project, have the advantages of saving feed coal, improving efficiency, reducing emissions, and stabilizing energy costs. One major gasification process is the hydrogasification of coal for producing SNG; this process can also be applied in a conventional route. The first steps to develop this process were planning, construction and operation of a semi-technical pilot plant for hydrogasification of coal in a fluidized bed having an input of 130 kg C/h. Before the completion of the development phase (reference phase) described here, several components were tested on part of which no operational experience had so far been gained; these were the newly developed devices, e.g. the inclined tube for feeding coal into the fluidized bed, and the raw gas leaving the gasifier. Concept optimizing of the thoroughly tested equipment parts led to an improved operational behaviour. Between 1976 and September 1982, the semi-technical pilot plant was operated for nearly 27 000 hours under test conditions, more than 12 200 hours of which it has worked under gasification conditions. During this time approx. 1 780 metric tons of dry brown coal and more than 13 metric tons of hard coal were gasified. The longest coherent operational phase under gasification conditions was 748 hours in which 86.4 metric tons of dry brown coal were gasified. Carbon gasification rates up to 82% and methane contents in the dry raw gas (free of N_2) up to 48 vol.% were obtained. A detailed evaluation of the test results provided information on the influence of additional parameters on the efficiency dates of the gasifier and a considerable refining of the results obtained previously.

30099 **(CONF-840570—5) Corrosion resistant materials for coal liquefaction systems.** Keiser, J.R.; Olsen, A.R.; Ibarra, S. Jr. (Oak Ridge National Lab., TN (USA); Gulf Research and Development Co., Pittsburgh, PA (USA)). 1984. Contract AC05-84OR21400. 20p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012333.

From Materials for future energy systems conference; Washington, DC, USA (1 May 1984).

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The corrosion response of alloys in various process environments in coal liquefaction pilot plants is discussed. Causes of corrosion and limiting conditions (such as temperature, pressure, and fluid velocity) are addressed. From the viewpoint of corrosion only, materials performance experience in the pilot plants can be characterized as follows: Sulfidation is the prevalent form of corrosion and is similar to that experienced in the petroleum and petrochemical industry, but materials appear to have 30 to 60°C lower maximum service temperatures. Sour gas and sour water environments are similar to those in the petroleum industry, but precautions must be taken to avoid materials that are susceptible to chloride stress corrosion cracking. Amine hydrochlorides form in the liquefaction process and can concentrate in fractionation towers where, together with the high phenol content, they can present a unique, highly corrosive environment. The severity depends on the chlorine content of the feed coal. Other corrosive species must be expected to be similar to those in the petroleum industry, but their specific roles have not been defined by pilot plant experience. Throughout the plant, erosion and erosion-corrosion are severe materials degradation phenomena. Pilot plant and laboratory testing suggest velocity and turbulence should be restricted in all components and piping handling slurries at all temperatures, and components that are exposed to high-velocity slurries require special design considerations and erosion-resistant materials. In conclusion, we feel that the materials performance data derived from the pilot plant operations together with the supporting research provide a strong basis for the selection of appropriate materials for construction of a direct coal liquefaction plant. 12 figures, 2 tables.

30100 (CONF-8105169—, pp 1.1-1.17) **Development of a catalytic process for alcohol-based synthetic transportation fuel from coal-derived synthesis gases.** Greene, M. (Chem Systems, Inc., Fairfield, NJ). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

This paper describes a chemical reactor and catalysts, with emphasis on catalyst type and performance, for producing primarily C_1 to C_4 saturated alcohols from synthesis gas. The properties of this methyl fuel and alkanol fuels and of mixtures with gasoline are described briefly. The paper consists of 17 slides. (LTN)

30101 (CONF-8105169—, pp 4.1-4.17) **Development of catalytic systems for the conversion of syngas to jet fuel and diesel fuel and higher alcohols.** Slegeir, W. (Brookhaven National Labs., Upton, NY). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

A highly active series of Fischer-Tropsch catalysts, yielding hydrocarbons suitable for use as diesel and jet fuels, have been developed. The method of catalyst formulation appears to be unique in catalytic chemistry, and these catalysts offer the promise of being superior to ordinary Fischer-Tropsch catalysts with regard to rate, operating conditions, handling techniques, and, quite possibly, product selectivity and longevity. These catalysts, at present consisting of two different metal combinations, are referred to by the generic term SOSS. Recent results with these catalysts in a slurry phase at 225°C and 1200 psi cold pressure indicate an activity nearly two orders of magnitude greater than those reported by the Bureau of Mines using conventional Fischer-Tropsch catalysts in fixed bed reactors. When conventional catalysts are compared with SOSS catalysts under our reaction conditions, the advantage drops to about a factor of 25; this reflects the desirability of the slurry phase for hydrocarbon synthesis but by no means diminishes the significance of the SOSS invention. In addition to high rates, the SOSS catalysts offer several other advantages. High activity is observed over a range of temperatures and pressures, with maintenance of good selectivity for linear aliphatic hydrocarbons. The catalyst is effective in a variety of slurry solvents, and is conveniently prepared in situ. Significant effort has been expended toward elucidating the unique structural features of the SOSS catalysts. It appears that these catalysts are layered, i.e., the support is coated with a layer of metal B, followed by a layer of A. Furthermore, the x-ray diffraction pattern of an active SOSS catalyst indicates relatively low dispersion but high orientation.

30102 (CONF-8405154—4) **Coal conversion with nondonor solvents: comparison with process solvents.** Jolley, R.L.; Rodgers, B.R.; Benjamin, B.M.; Douglas, E.C.; McWhirter, D.A. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 32p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012355.

From American Institute of Chemical Engineers spring national meeting; Anaheim, CA, USA (20 May 1984).

Coal liquefaction yields were determined for 1-naphthanol, quinoline, naphthalene, phenanthridine, phenol, phenanthrene, carbazole, pyrene, and diphenyl ether using tubing-bomb tests. Comparisons are made with SRC and ITSL process solvents. The relative effectiveness of selected pure nondonor solvents for converting Kentucky No. 9 coal (Fies mine) to pyridine-soluble products at 427°C (800°F), 10-min reaction time, and 1.5 solvent-to-coal ratio was: 1-naphthol, quinoline, naphthalene, phenanthridine, phenanthrene, phenol, carbazole, pyrene, and diphenyl ether. The range of conversions varied from 78% to 32%. Without supplemental hydrogen, among the pure nondonor compounds studied only 1-naphthol (78% conversion) was as effective at converting coal to pyridine-soluble material as two high-quality process solvents, Wilsonville SRC-I (61%) and Lummus ITSL heavy oil solvent (82%). Pure 1-naphthol appears to be highly effective for solubilizing coal; pure quinoline was moderately to highly effective; pure naphthalene, phenanthrene, pyrene, phenanthridine, carbazole, phenol, and diphenyl ether were only moderately effective. The high conversion efficacy of 1-naphthol may be partially attributable to its condensation to binaphthol and the resulting availability of hydrogen, i.e., it may act as a limited hydrogen donor.

30103 (DOE/ET/10137—T9) **Type I evaluation of Exxon Donor Solvent (EDS) liquefaction process residue from Texas lignite as a feedstock for the Texaco Gasification Process.** Wu, C.M.; Robin, A.M. (Texaco, Inc., Montebello, CA (USA). Montebello Research Lab.). Apr 1984. Contract AC01-76ET10137. 14p. (FE—2247-36). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84013281.

A laboratory evaluation of a 20-pound sample of vacuum tower bottoms from the Exxon Donor solvent (EDS) liquefaction process was completed at Texaco's Montebello Research Laboratory. The sample was obtained during the liquefaction of Texas lignite from the Martin Lake mine at the EDS liquefaction process pilot plant in Baytown, Texas. The residue is judged to be suitable feedstock for the Texaco Gasification Process charged as an aqueous slurry of pulverized solid at ambient temperature. Feeding the residue as a molten fluid would require that it be stored and fed to the gasifier at temperatures in excess of 600°F. It is thus judged to be a marginally acceptable feedstock for the Texaco Gasification Process as a molten fluid. Based on the laboratory tests, operating conditions and yields were estimated for gasifying 1600 pounds per hour of solid residue in a water slurry and for gasifying 1000 pounds per hour of molten residue, both at a gasifier pressure of 1000 psig.

30104 (DOE/ET/10143—T37-Vol.1) **H-Coal Pilot Plant. Volume I. 1.0 - executive summary and general project description, 2.0 - general reference section. Final report.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 207p. NTIS, PC A10/MF A01; 1; GPO Dep. Order Number DE84010839.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This Final Report documents the Phase III operations of the H-Coal direct liquefaction Pilot Plant at Catlettsburg, Kentucky, by Ashland Synthetic Fuels, Inc. The project was initiated in 1965 under the Office of Coal Research, US Department of Interior Contract No. 14-32-0002-154 with Hydrocarbon Research, Inc., and was completed under US Department of Energy Contract No. DE-AC05-76ET10143 with Ashland Synthetic Fuels, Inc. Data generated by HRI's Bench Scale and 3-ton per day Process Development Units were used as the design basis for the Pilot Plant. Subsequent Pilot Plant operations confirmed the validity of the data base. This report contains process, mechanical and environmental assessments of the Pilot Plant germane to commercial scale-up.

30105 (DOE/ET/10143—T37-Vol.2) **H-Coal Pilot Plant. Volume II. 3.0 - pilot plant operations. Final report.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 415p. NTIS, PC A18/MF A01; 1; GPO Dep. Order Number DE84010838.

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Volume II of the H-Coal Pilot Plant Final Report is devoted entirely to Pilot Plant Operations. It contains a description of the plans, programs, tests, schedules, operating experience and other activities related to the overall operations at the H-Coal Pilot Plant. Included are discussions of the operating modes, various feed coals, Pilot Plant and PDU yield comparisons and the operability and associated problems of the individual systems. Recommendations based on operating experience and applicable to commercial synfuels facilities are presented. The Abbreviated Index, included in this volume, provides an easy reference to all of the topics addressed in the ten volumes comprising this Final Report. Further reference material such as an overall detailed index, a bibliography of H-Coal related reports, an equipment list, and the abbreviations used is presented in Volume I, Section 2.0. 51 figures, 52 tables.

30106 (DOE/ET/10143—T37-Vol.3) **H-Coal Pilot Plant. Volume III. 4.0 - equipment performance: 4.1 - test program, 4.2 - slurry pumps, 4.3 - H-Coal reactor, 4.4 - heaters. Final report.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 524p. NTIS, PC A22/MF A01; 1; GPO Dep. Order Number DE84010837.

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Volume III of the H-Coal Pilot Plant Final Report is the first of four volumes devoted to equipment performance. It contains an introduction to this rather large section of the report along with a description, definition of objectives and the overall results of the Equipment Test Program. In addition, this volume contains the physical description, performance, modifications made, inspection data and commercial design and procurement recommendations for the following categories of equipment: 4.2 - Slurry Pumps, 4.3 - H-Coal reactor, and 4.4 - Heaters. The remaining categories of major Pilot Plant equipment are discussed in Volumes IV, V and VI.

30107 **(DOE/ET/10143—T37-Vol.4) H-Coal Pilot Plant. Volume IV. 4.0 - equipment performance: 4.5 - heat exchangers, 4.6 - towers, 4.7 - storage tanks, 4.8 - drums and separators. Final report.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 556p. NTIS, PC A24/MF A01; 1; GPO Dep. Order Number DE84010836.

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Volume IV of the H-Coal Pilot Plant Final Report is the second of four volumes devoted to equipment performance. This volume contains an introduction to the Equipment Performance Section followed by the physical description, performance, modifications made, inspection data and commercial design and procurement recommendations for the following categories of equipment: 4.5 - heat exchangers, 4.6 - towers, 4.7 - storage tanks, and 4.8 - drums and separators. The remaining categories of major Pilot Plant equipment are discussed in Volumes III, V and VI.

30108 **(DOE/ET/10143—T37-Vol.5) H-Coal Pilot Plant. Volume V. 4.0 - equipment performance: 4.9 - solids separation, 4.10 - block valves, 4.11 - control valves. Final report.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 528p. NTIS, PC A23/MF A01; 1; GPO Dep. Order Number DE84010835.

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Volume V of the H-Coal Pilot Plant Final Report is the third of four volumes devoted to equipment performance. This volume contains an introduction to the Equipment Performance Section followed by the physical description, performance, modifications made, inspection data and commercial design and procurement recommendations for the following categoris of equipment: 4.9 - Solids Separation, 4.10 - Block Valves, and 4.11 - Control Valves. The remaining categories of major Pilot Plant Equipment are discussed in Volumes III, IV and VI.

30109 **(DOE/ET/10143—T37-Vol.6) H-Coal Pilot Plant. Volume VI. 4.0 - equipment performance: 4.12 - pressure safety valves, 4.13 - instrumentation, 4.14 - process piping systems, 4.15 - hydrogen compressors. Final report.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 422p. NTIS, PC A18/MF A01; 1; GPO Dep. Order Number DE84010834.

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Volume VI of the H-Coal Pilot Plant Final Report is the last of four volumes devoted to equipment performance. This volume contains an introduction to the Equipment Performance Section followed by the physical description, performance, modifications made, inspection data and commercial design and procurement recommendations for the following categories of equipment: 4.12 - Pressure Safety Valves, 4.13 - Instrumentation, 4.14 - Process Piping Systems, and 4.15 - Hydrogen Compressors. The remaining categories of major Pilot Plant equipment are discussed in Volumes III, IV and V.

30110 **(DOE/ET/10143—T37-Vol.7) H-Coal pilot plant. Final report. Volume VII. Materials evaluation.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 201p. NTIS, PC A10/MF A01; 1; GPO Dep. Order Number DE84010833.

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Volume VII of the H-Coal Pilot Plant Final Report is devoted entirely to Materials Evaluation. This section contains a description of the plans, programs, tests, operating experience and other activities related to materials evaluation at the H-COAL Pilot Plant. Included are the data obtained from corrosion monitoring coupons, visual inspections and nondestructive testing methods as well as the results of failure analysis, metallographic evaluations and erosion monitoring. Recommendations based on these evaluations and applicable to commercial synfuels facilities are also presented.

30111 **(DOE/ET/10143—T37-Vol.8) H-Coal Pilot Plant. Volume VIII. 6.0 - environmental, 7.0 - health and safety. Final report.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 398p. NTIS, PC A17/MF A01; 1; GPO Dep. Order Number DE84010832.

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Volume VIII of the H-Coal Pilot Plant Final Report is comprised of the following two sections: 6.0 - Environmental, and 7.0 - Health and Safety. These sections contain a description of plans, programs, policies, studies, tests, operating experience and other activities related to the environmental, health and safety aspects of the operation of the H-Coal Pilot Plant. In addition, this volume includes sampling data, evaluations and recommendations applicable to commercial synfuels facilities.

30112 **(DOE/ET/10143—T37-Vol.9-10) H-Coal pilot plant. Final report. Volumes IX and X.** (Ashland Synthetic Fuels, Inc., KY (USA)). Apr 1984. Contract AC05-76ET10143. 402p. NTIS, PC A18/MF A01; 1; GPO Dep. Order Number DE84010831.

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Volume IX of the H-COAL Pilot Plant Final Report is comprised of the following sections: Data Management; Laboratory Functions, Sampling Program and Analytical Studies; Product Disposition; Quality Assurance; and Subject Inventions. These sections contain a detailed discussion of the acquisition, storage and retrieval of process data, evaluation of laboratory functions and the sampling program, a discussion of the disposition of all products and waste products resulting from Pilot Plant operations, the quality assurance program and associated investigations, plans and assessments, and finally, a presentation of abstracts and disposition of Subject Inventions generated under the H-COAL Pilot Plant Program.

30113 **(DOE/ET/10532—T18) Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes.** Sullivan, R.F. (Chevron Research Co., Richmond, CA (USA)). May 1984. Contract AC22-76ET10532. 35p. (FE—2315-102). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012123.

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This report gives results of our current studies on refining of integrated two-stage liquefaction (ITSL) process product to distillate fuels. We made a 2385-hr second-stage hydrocracking pilot plant run in which hydrotreated ITSL oil was cracked to extinction over ICR 202 catalyst. It included series of tests to determine the quantity and quality of products produced at a variety recycle cut points (350°F, 400°F, 450°F, 500°F, 525°F, and 550°F). At 350°F, the entire liquid product is naphtha. At higher cut points, products include a combination of naphtha and jet fuel. The smoke point of the jet fuel fraction will be of particular interest. Analytical results at the higher cut points are incomplete. We are studying the effect of ITSL syncrude end point on the severity necessary for hydrotreating to distillate products. Lummus provided Chevron with an additional barrel of ITSL process product (Illinois No. 6, Burning Star Mine) with an end point of about 800°F to serve as feed. A 1080-hydrotreating pilot plant test was made with this feed and ICR 106 catalyst at 0.5 LHSV and 2300 psia hydrogen partial pressure. The new feed is clearly somewhat harder to upgrade than the lower end point feed previously tested. But it appears we can make specification jet fuel at these conditions. All of the analyses are not complete, though. 18 tables and 1 figure.

30114 **(DOE/ET/13397—20) Studies in coal liquefaction with application to the SRC and related processes. Report for the period August-September 1983.** Tarrer, A.R.; Guin, J.A.; Curtis, C.W. (Auburn Univ., AL (USA). Dept. of Chemical Engineering). Apr 1984. Contract AC22-79ET13397. 58p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84010795.

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An assessment of the mass transfer phenomena involved in coal liquefaction process is made based on the analysis of model compound studies and pilot plant data. Model compound studies were conducted using naphthalene hydrogenation as the reaction system. It was found that mixing had no significant effect on naphthalene conversion, when the TBMR was agitated above a critical frequency, in this case, 550 cpm. The catalyst pore diffusion resistances were not significant for naphthalene hydrogenation, when 1/8 inch pellets were used. Based on a steady-state, well-mixed slurry phase reaction model, it was found that the coal liquefaction hydrogenation reaction in pilot plant reactors was largely controlled by kinetic factors.

30115 **(DOE/FE/60181—96) Supercritical solvent extraction.** Swanson, M.L.; Dollimore, J.; Schobert, H.H. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1984. Contract FC21-83FE60181. 4p. (CONF-8406121—1-Abst.). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012921.

From Contractors' conference - DOE advanced research and technology development program; Pittsburgh, PA, USA (5 Jun 1984).

Analysis of supercritical water extracts of Indian head lignite determined that approximately 69% of the extract was of a polar nature, 26% was aromatic and 5% was aliphatic hydrocarbons weight several identifiable compounds found in the aromatic fraction. Use of a 90 mole % supercritical water-CO mixture resulted in a decrease in the percent conversion as compared to those obtained using supercritical water and an increase in the resulting polarity of the extract. Ultimate and GPC anlayses possibly indicated a slight lowering of the overall molecular weight of the extract.

30116 **(DOE/FE/60181—1602) Use of treated gasification wastewater in a pilot cooling tower. Phase I. Final report for the period ending January 31, 1984.** Willson, W.G.; Hendrikson, J.G.; Mann, M.D.; Galegher, S.J.; Gallagher, J.R.; Mayer, G.G.; Thomas, W.C.; Winton, S.L.; Nelson, D.F. (North Dakota Univ., Grand Forks (USA). Energy Research Center; Radian Corp., Austin, TX (USA)). 16 May 1984. Contract FC21-83FE60181. 185p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84012119.

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During the UNDERC cooling tower tests, data were colleced and evaluated in five major areas: characterization of cooling tower streams, process performance, biofouling, corrosion, and inorganic/organic fouling. A summary of the results and conclusions for each area is presented. Recommendations are provided for research and development programs to further define the pretreatment and operating requirements for the use of wastewater as cooling tower makeup. The results of the Phase I-Pilot Cooling Tower test have revealed several potential problems that may arise from the use of a relatively high organic content gas liquor as cooling tower makeup. Most of the problems identified are related to the presence of organics in the wastewater which promote biofouling/fouling, corrosion, and emissions from the cooling tower. The Phase II-Pilot Cooling Tower Test will address this issue by identifying the advantages of further treatment of stripped gas liquor to reduce the organic content to a lower level before use in the cooling tower. This test will parallel the Phase I test using the same system and monitoring procedures. Comparison of the results of Phase I and Phase II tests will provide an indication of how well problem areas can be avoided with additional makeup water pretreatment. 39 references, 34 tables, and 25 figures.

30117 **(DOE/LC/10694—1519) Remanent and rock magnetic properties at the Hanna, Wyoming underground coal gasification site: Hanna II phases 2 and 3 experiment.** Geissman, J.W.; Callian, J.; Youngberg, A.D. (Colorado School of Mines, Golden (USA). Dept. of Geology). Sep 1983. Contract AS20-81LC10694. 58p. NTIS, PC A04/MF A01. Order Number DE84003019.

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Several underground coal gasification (UCG) experiments have been conducted in the Hanna No. 1 coal seam. During the fall, 1980, the Laramie Energy Technology Center performed a post-burn field study of the Hanna II, Phases 2 and 3 experiment at the Hanna UCG site. The field work consisted of high resolution seismic, drilling, coring, and geophysical logging. The Paleomagnetism Laboratory, Department of Geology, Colorado School of Mines, contributed to the post-burn study by doing remanent and rock magnetic measurement laboratory work on the core material. Funding was provided by the Laramie Energy Technology Center. The purpose of the study was to determine the nature of the remanent magnetism of the overburden Hanna Formation and changes in the remanence and magnetic mineralogy attending underground coal gasification experiments. With this information, further estimates of the thermal and chemical conditions reached during the conversion experiment could be made. The magnetization data, together with previous petrographic observations, suggest that magnetite is being formed in a reducing process at the expense of detrital ferromagnesian silicates and possible hematite and geothite in the overburden sediments. Thermal gradients immediately above the burn cavity are difficult to estimate; changes in magnetic properties of unaltered Hanna Formation overburden are activated at temperatures as low as 300°C. The magnetic expression of the burn cavity should be able to be modelled as being due to a thin slab overlying the cavity. Pyrometamorphosed material that has collapsed into the cavity, should have any magnetization which is randomized due to collapse and therefore should be able to be incorporated into a magnetic anomaly model. 32 references, 27 figures.

30118 **(DOE/MC/19163—T21) Great Plains ASPEN model development. Technical progress report, April 1-April 30, 1984.** (Scientific Design Co., Inc., New York (USA)). 11 May 1984. Contract AC21-82MC19163. 106p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012845.

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During the period 4/1/84 through 4/30/84 work was performed on the following tasks: Task No. 1 simplified models and task No. 4 rigorous models (Area 4900-methanol synthesis); and task No. 2 review of existing gasifier models. The ASPEN horizontal sizing routine, SUSOL, has been modified. Improvements have been made to the sizing calculations based on HALCON SD's own design methods. The user can also enter the maximum allowable horizontal velocity specifications.

30119 **(DOE/MC/19207—1614) Plasticity, agglomeration and volatiles secondary reactions in coal pyrolysis (Task A). Annual report, September 10, 1982-February 29, 1984.** Howard, J.B.; Fong, W.S.; Serio, M.A.; Beitz, B.R.; Lennox, R.B.; Montero-Garcia, J.H.; Sawada, K.; Sontheimer, S.G.; Peters, W.A. (Massachusetts Inst. of Tech., Cambridge (USA)). Apr 1984. Contract AC21-82MC19207. 81p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012933.

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The overall objective of this research is to obtain, for conditions pertinent to modern coal gasification practice, improved basic understanding of coal plasticity, coal particle agglomeration, and secondary reactions of freshly formed coal pyrolysis tars. Development and construction of a final, first generation version of a high temperature, fast response coal viscometer have been completed. The viscosity of a Pittsburgh coal under a heating rate of a few hundred K/s was found to be in the range 10^2 to 10^4 poises. A systematic study of homogeneous and heterogeneous secondary reactions of tar has been completed, using a two-stage (generation/cracking) tubular reactor. The system contains two independently

heated tubular reactors connected in series. A thin bed of coal, diluted with sand to prevent agglomeration, is pyrolyzed in the upstream reactor (reactor-1) at a low heating rate (3°C/min) in order to produce fresh tars at temperatures (< 500°C) unfavorable to secondary reactions. These tars (and other volatiles) are then swept with carrier gas, usually helium, to the downstream (reactor-2) stage which is held isothermal at a temperature between 500 and 900°C, and then to product traps. In the second stage, the separate effects of temperature (500 to 900°C) and residence time (0.6 to 1.1 s) on homogeneous and heterogeneous tar secondary reactions were studied at 0.3 to 1.3 atm (gauge) pressure in helium. Selected runs were done at longer residence times (up to 3.9 s) for homogeneous experiments and in CO_2 atmospheres (1 to 5 atm, gauge) for heterogeneous experiments with active carbon. Gases and light oils were analyzed by gas chromatography. Tars were analyzed by H-NMR, gel permeation chromatography, column chromatography, and elemental analysis. Surface areas and pore size distributions of char and active carbons were respectively measured by N_2 adsorption and Hg porosimetry. Results are discussed. 61 references, 35 figures, 5 tables.

30120 **(DOE/NBM—4012912) Summary of university contracts and grants supported by the Office of Fossil Energy, FY 1983.** (JWK International Corp., Pittsburgh, PA (USA)). 1983. 466p. NTIS, PC A20/MF A01; GPO Dep. Order Number DE84012912.

This book is a compilation of summaries of research contracts and grants at universities supported by the Office of Fossil Energy in FY83. The summaries consist of one-page fact sheets for each contract or grant providing business information, objectives of research, statement of work, and major accomplishments. The business information was obtained from the Procurement and Assistance Data System (PADS) and verified by the Technical Project Officer (TPO) who also provided the narratives on the objectives, the statement of work, and the accomplishments. In addition to the Pittsburgh Energy Technology Center, these TPOs are located at the Bartlesville Project Office, Grand Forks Project Office, Laramie Project Office, Morgantown Energy Technology Center, Chicago Operations Office, Oak Ridge Operations Office, San Francisco Operations Office and Headquarters. We acknowledge with thanks the cooperation we received from the TPOs and their organizations in preparing this compilation. The names of the TPOs, their FTS telephone numbers, and the offices of their affiliation are shown for each contract and grant. Responsibility for collecting the information and preparing the summary books has been delegated to the Pittsburgh Energy Technology Center. The contracts and grants are classified by research and development category as signified by DOE's budget and reporting number. Within each category, the contracts and grants are arranged alphabetically by state, alphabetically by university, and in contract number order. Indices in the back of the book are designed to provide separate listings by contract number, the DOE contract office, and alphabetically by state and university name. An alphabetically arranged technical subject index is also provided.

30121 **(DOE/NBM—4012917) Summary of AR and TD/APT contracts and grants supported by the Office of Fossil Energy FY 83.** (JWK International Corp., Pittsburgh, PA (USA)). 1983. 305p. NTIS, PC A14/MF A01; 1; GPO Dep. Order Number DE84012917.

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This book is a compilation of summaries of research contracts and grants supported by the Office of Fossil Energy in FY83 under the following two programs: (1) Advanced Research and Technology Development (AR and TD); and (2) Advanced Process Technology (APT). The summaries consist of one-page fact sheets for each project, contract or grant providing business information, objectives of the research, statement of work, and major accomplishments. The business information was obtained from the Procurement and Assistance Data System (PADS) and verified by the responsible Technical Project Officer (TPO) who also provided the narratives on the objectives, the statement of work, and the accomplishments. In addition to the Pittsburgh Energy Technology Center, these TPOs are located at the Bartlesville Project Office, Grand Forks Project Office, Laramie Project Office, Morgantown Energy Technology Center, Chicago Operations Office, Idaho Falls Operations Office, Oak Ridge Operations Office, San Francisco Operations Office and Headquarters. We acknowledge with thanks the cooperation we received from the TPOs and their organizations in preparing this compilation. The names of the TPOs, their FTS telephone numbers, and the offices of their affiliation are shown for each contract and grant. Responsibility for collecting the information and preparing the summary books has been delegated to the Pittsburgh Energy Technology Center. The contracts and grants are classified by research and development category as signified by DOE's budget and reporting number. Within each category, the contracts and grants are arranged alphabetically by contractor. Indices in the back of the book are designed to provide separate listings by contract number, the DOE contract office, and alphabetically by state and contractor. An alphabetically arranged technical subject index is also provided.

30122 **(DOE/OR/03054—22) SRC-I solid product characterization. Final technical report.** Skinner, R.W.; Tiedge, W.F.; Znaimer, S. (International Coal Refining Co., Allentown, PA (USA)). Aug 1983. Contract AC05-78OR03054. 73p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84012814.

ICRC has completed a program characterizing solvent-refined coal (SRC) solids in manners relevant to the various potential markets for these materials. Samples of Kerr-McGee ash concentrate (KMAC), light, heavy, and hydrocracked SRC were collected from various runs conducted at the Wilsonville Advanced Coal Liquefaction Facility. Samples of hydrocracked SRC and green coke from the CE-Lummus LC-Finer and coker pilot plants were also evaluated, as were samples of green and calcined coke produced in an ALCOA pilot plant. ICRC also initiated a research program to measure the metals content of SRC and the green and calcined coke derived from it, and to identify and develop analytical procedures to rapidly and precisely quantify the metals concentrations in SRC and coke. Finally, a round-robin analysis of the metals in SRC and KMAC samples was conducted by five laboratories. The metals contents of green and calcined anode coke produced from SRC in a bench-scale coker were also measured. 9 references, 26 tables.

30123 **(DOE/OR/03054—50) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 69p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84013337.

This report presents the interim results of the genetic and animal toxicity testing program; of SRC-I products, process intermediates, and waste materials. It also discusses the structure of the program, including the philosophy underlying its design, as well as the sources, processing, and sample handling of the materials tested. Finally, it summarizes the results of the tests completed at the time when the Baseline Design package was prepared, and discusses the effects of these results on the health risk assessment and environmental impact analysis process. The appendices present the original reports that are complete. The genetic toxicity testing program indicated that the following substances are mutagenic: DMSO extracts of first- and second-stage solid products, as well as aqueous and saline suspensions of solids; all liquid products except hydrotreated naphthas; DMSO extractions of CSD ash concentrate; raw wastewaters; coker liquids; and residual fuel. Except for aqueous and saline suspensions of solid products, these results were generally anticipated. Genetic toxicity testing indicated that the following substances are not mutagenic: aqueous extracts of solid products and of gasifier fly ash, treated wastewaters, hydrotreated naphtha, and combustion fly ash. Acute toxicity tests indicated that the solid products are mildly irritating to eyes, but are not primary skin irritants. Acute inhalation toxicity tests of solids showed no significant effects. Middle distillates were rated slightly toxic to toxic orally, are mild primary irritants and probable skin sensitizers, and are severely irritating to eyes. Range finding tests for long-term skin painting and dermal teratology tests established the dosages to be used in these programs, and further confirmed the skin irritation properties of the middle distillate liquids.

30124 **(DOE/OR/03054—50-App.A-Vol.1) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix A. Volume 1. Microbial mutagenicity evaluations (Ames Test) basic program reports.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 543p. NTIS, PC A23/MF A01; 1; GPO Dep. Order Number DE84013324.

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Appendix A - Volume 1 contains 30 individual reports of Microbial Mutagenicity Evaluations (Ames test) of extracts of solvent-refined coal (sometimes treated with hydrogen) and of coal liquid distillate fractions. For a concise summary of the results see the abstract of the main report. (LTN)

30125 **(DOE/OR/03054—50-App.A-Vol.3) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix A, Volume 3. Microbial mutagenicity evaluations (Ames Test) Option IB reports.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 262p. NTIS, PC A12/MF A01; 1; GPO Dep. Order Number DE84013326.

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Appendix A-Volume 3 contains the results of the Ames Test on 15 SRC-I products (light oil and coker condensate), fly ash/slag, fly ash, waste water, ozonation and bioreactor effluents. In most cases phenol extracts of the material were used; in a few cases water or DMSO were used; and in other cases the material was used directly or the extract was concentrated before testing. The result for each material is given individually: some of the above materials were mutagenic by the Ames Test and some were not. For a concise summary of the results see the abstract for the main report. (LTN)

30126 **(DOE/OR/03054—50-App.B-Vol.1) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix B. Volume 1. In vivo cytogenetics and in vitro mammalian mutagenicity (mouse lymphoma test) basic program.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 435p. NTIS, PC A19/MF A01; 1; GPO Dep. Order Number DE84013338.

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(1) SRI International assessed the ability of SRC-Solid (2043-CB) and (2044-CB) to induce chromosomal abnormalities in bone marrow cells from dermally exposed male and female Fischer 344 rats. In the definitive study, rats were treated dermally with SRC-Solid at doses of 500, 1250, and 5000 mg/kg/day for five days and sacrificed the following day. Bone marrow cells extracted from these rats and from untreated and negative and positive control groups, were evaluated microscopically for mitotic index and chromosomal abnormalities. (2) SRI International examined 9 coal liquid fractions, an extract and suspension of KMAC and 2 extracts of hydrotreated SRC for mutagenic activity at the thymidine kinase locus in the L5178Y mouse lymphoma cell assay, both in the absence and presence of a metabolic activation system (S-9). Under both activation conditions, the extract induced dose-dependent increases in the mutation frequency of the treated cells to greater than three times the mutation frequency of the solvent control samples, indicating a positive response. The response was stronger with than without S-9. For a concise summary of the results see the abstract of the main report. (LTN)

30127 **(DOE/OR/03054—50-App.C) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix C. Chemical evaluation of SRC samples for genetic toxicity testing - basic program reports.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 231p. NTIS, PC A11/MF A01; 1; GPO Dep. Order Number DE84013328.

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This Appendix presents the reports submitted by SRI regarding the chemical analyses of 32 samples done in support of the genetic toxicity testing. This chemical characterization provided an analytical signature for comparison, to demonstrate that there had been no gross changes in the nature of the chemicals stored by SRI during their investigations. Both ICRC and SRI considered it important to demonstrate the general stability of the samples during the testing period. The observed absence of gross changes, combined with the specified handling and storage procedures, implies (although it does not absolutely prove) that changes in the biological activity of the samples tested were minimal. ICRC feels that any minor chemical changes would cause only quantitative differences in the results of the genetic toxicity testing (e.g., a change in the number of revertants per plate of a particular sample in the Ames test). Qualitative assessments would be very unlikely to change. For example, a substance giving a positive response in the Ames test would be classed as a mutagen, even if the number of revertants per microgram of material changed somewhat due to chemical changes during storage. Furthermore, changes that might occur during sample handling for this program would be of the same nature as those that might occur during handling and storage at the demonstration plant.

30128 **(DOE/OR/03054—50-App.D) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix D. Acute animal studies reports.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 633p. NTIS, PC A99/MF A01; 1; GPO Dep. Order Number DE84013329.

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Appendix D is a collection of 25 individual reports on the toxicity of SRC-I products, intermediates and residues to rabbits, rats and guinea pigs with acute oral, dermal and inhalation exposure. It includes also eye and dermal irritation tests in rabbits and guinea pigs and dermal sensitization studies in albino guinea pigs. (LTN)

30129 **(DOE/OR/03054—50-App.E) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix E. Subchronic dermal studies reports.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 201p. NTIS, PC A10/MF A01; 1; GPO Dep. Order Number DE84013330.

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The objective of this study was to determine the dosage levels to be employed in a 13-week toxicity study in rats. A maximum tolerated dose was not achieved in the conduct of this study. Dermal irritation at the site of application and a decreased body weight gain attributed to the application of the test article, First Stage Middle Distillate (SRC) were both observed at the low dosage level, 312 mg/kg/day. Compound related observations which were noted at higher dosage levels included dermal irritation, decreased body weight gain, compound related pharmacotoxic signs, and mortality. Test article related macroscopic changes consisting of erythema, thickening, coriaceousness, and ulcerations were observed at the application site of all dosage groups exposed to First Stage Middle Distillate (SRC) for 4 weeks. Neither systemic changes nor changes indicative of a manner of death were observed. The objective of this study was not achieved as a maximum tolerated dose was not obtained, however, an additional 2-week dose-range finding study in rats has been scheduled to augment the findings of this study. A further similar test to the above is described. Similarly, two range finding dermal teratology studies with middle distillate are described. The 1000 and 2000 mg/kg/day treatment groups displayed marked increases in the mean number of postimplantation losses and corresponding decreases in the number of viable fetuses compared to values for the control group. (LTN)

30130 **(DOE/OR/03054—50-App.F) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix F. QC/QA monitoring reports.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 357p. NTIS, PC A16/MF A01; 1; GPO Dep. Order Number DE84013331.

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In order to ensure that the genetic and animal toxicity testing programs are being performed according to highest standards, ICRC chose to augment its own Quality Assurance efforts, as well as those of the testing subcontractors, with independent reviews. Experimental Pathology Laboratories (EPL) has reviewed various aspects of the completed parts of the program, and continues to review the ongoing studies. EPL's activities began with initial site visits to both SRI and IRDC to evaluate such areas as general laboratory conditions, routine procedures, provisions for handling samples, and recording and tracing data. EPL also initially reviewed each test protocol. By identifying potential problem areas, these initial EPL activities helped ensure that there would be no later difficulties in achieving and documenting the high standards of performance desired for these studies. EPL visited the sites to observe procedures, inspect data handling and analysis, and comment on any observed or anticipated problems. After each visitation, EPL immediately transmitted its comments regarding the significant findings of that visit directly to ICRC. EPL then summarized its findings in written reports to ICRC, which are reproduced here. These reports are organized by EPL according to the types of tests, rather than by sample material or specific occasion of EPL's activity. The QA/QC monitoring done by EPL indicates that all studies are being performed in accordance with experimental protocols, and that they follow the required Good Laboratory Practice Regulations as issued by the US FDA. The data produced by these studies are valid and usable. Minor errors found will not change the final interpretation of the raw data or affect the scientific validity of these studies.

30131 **(DOE/OR/03054—50-App.G) Interim report on the genetic and animal toxicity testing of SRC-I products, intermediates, and waste materials. Appendix G. Sample history and documentation.** Drozdowicz, B.Z.; Kelly, C.M. (International Coal Refining Co., Allentown, PA (USA)). Sep 1983. Contract AC05-78OR03054. 125p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84013332.

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This document traces the history of the samples used in the genetic and animal toxicity testing of SRC products, process intermediates, and waste materials. It begins with a brief summary (Table G-1, page G.1.2), which indicates the source, further processing, storage, and transmittals of all sample materials used in the testing. This summary is followed by more detailed descriptions of the various stages in the handling of sample materials, which in turn refer to various letters, work orders, and memos that document the history of these materials. A large number of materials originating from several sources are involved in this testing. Almost all of thes materials received further processing to prepare samples that are more representative of products, process intermediates, and waste materials expected to be produced by the SRC-I Demonstration Plant. ICRC believes that all the samples were produced, handled, and prepared in such a way as to render them fully representative of the SRC-I process as it would be practiced at the SRC-I Demonstration Plant.

30132 **(DOE/OR/03054—87) Laboratory tests of phenol removal and ammonia and hydrogen sulfide stripping from SRC-I wastewater. Final technical report.** (Chem-Pro Corp., Fairfield, NJ (USA)). Sep 1983. Contract AC05-78OR03054. 50p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012433.

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Chem-Pro Corporation conducted a laboratory testing program to evaluate the use of its proprietary dephenolization process on wastewater from the SRC-I direct coal-liquefaction process. A primary objective was to develop operating conditions for use of the process on water that had not been stripped of ammonia and hydrogen sulfide. Also evaluated were the steps following phenol removal: raffinate stripping (solvent removal), ammonia/hydrogen sulfide stripping, and solvent and phenol recovery distillation. With an overall throughput of 1000 gal/hr-ft^2 and a feed-to-solvent ratio of 8:1, the total phenolics concentration was successfully reduced during the extraction step below the 120-ppM specification. The presence of H_2S and NH_3 set an upper limit on the steam rate for solvent-stripping; exceeding this rate caused solids to precipitate. Ammonia can be stripped from dephenolized, solvent-stripped water to below 200 ppM and hydrogen sulfide to slightly above 10 ppM. 3 references, 1 figure, 8 tables.

30133 **(DOE/OR/03054—89) Effect of feed gas trace components on the SRC-I hydrogen purification unit. Final technical report.** Li, T.C. (International Coal Refining Co., Allentown, PA (USA); Air Products and Chemicals, Inc., Allentown, PA (USA)). Dec 1983. Contract AC05-78OR03054. 79p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012975.

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Results of a study of the effects of trace contaminants on the design of the hydrogen purification unit (HPU) for the SRC-I Demonstration Plant are presented. Three types of trace components - unsaturated light hydrocarbons (acetylene, ethylene, and butadiene, etc.), nitrogen oxides, and mercury - were found to be associated with problems that will necessitate modifying the HPU design. Concentrations of the trace components present in the HPU feed were estimated based on gas analyses of the process hydrogen streams at the Wilsonville SRC-I pilot plant. Next, gas/liquid equilibrium and solid solubility correlations for selected trace components in the process streams were developed based on published data. The data base was then incorporated into APCI's computer models to be used for evaluation of trace-component freeze out. At the expected HPU feed concentration, acetylene will freeze in the cold box, coke on the molecular sieve during reactivation, and form an unstable, potentially explosive compound with both nitrogen oxides and copper. Butadiene will also coke on the molecular sieve and, like acetylene, can react with nitrogen oxides to form an explosive compound. Thus, both acetylene and butadiene should be removed by hydrotreating upstream of the molecular sieve adsorbers. Since nitrogen oxides will react with unsaturated hydrocarbons to produce unstable compounds that can explode, a nitrogen oxide removal step is also required. Adsorption or catalyst reduction of the nitrogen oxides outside the cold box are possible removal methods. Mercury will freeze in the cold box in a fashion that may prevent complete removal during defrost, and will also attack the copper tubes of the heat exchanger. An adsorption technology for removing mercury should be included in or upstream of the HPU unit. Trace components other than acetylene, butadiene, mercury, and the nitrogen oxides will not cause serious problems.

30134 **(DOE/PC/30209—T6) Solvent tailoring in coal liquefaction. Quarterly report, January 1984-March 1984.** Tarrer, A.R.; Guin, J.A.; Curtis, C.W.; Williams, D.C. (Auburn Univ., AL (USA). Dept. of Chemical Engineering). 1984. Contract FG22-80PC30209. 5p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012211.

In this project the function of the process solvent regarding vapor-liquid equilibrium, hydrogen donation, and catalyst activity has been explored. The aim is to identify mechanisms whereby the solvent functions so as to allow tailoring of the process solvent composition for improved coal liquefaction and product selectivity. Work has continued in several areas. With respect to the hydrogenation of naphthalene in the spinning basket reactor, calculations have been made which indicate that pore diffusion may have a significant influence on the hydrogenation rate. The interaction between solvent phase behavior and hydrogenation activity is extremely complex. When using lighter solvents, a major effect is the increased residence time of the heavier species, leading to their increased conversion. Volatilization of the lighter solvent components has also been found to be a significant factor in catalyst coking and deactivation. A collection of several donor compounds was evaluated for their relative efficiency in converting coal to cresol solubles. Attempts to correlate the relative efficiency of the various donor

species were made on the basis of thermodynamic stability and structural features of the molecules. The relative kinetics of coke formation on a series of hydrotreating catalysts has been studied and a theoretical model for the coking process has been formulated. The kinetics of coke burnoff was also studied for several spent catalysts. Two types of coke, with different oxidation rates were identified. The coke resulting from coal liquids hydroprocessing appears to be less refractory than coke from catalytic cracking operations. Calculations show that the coke burnoff occurs in a diffusion controlled regime using extrudate pellets.

30135 **(DOE/PC/50794—T2) Change in catalyst activity during catalytic steam gasification of char.** Shadman, F. (Arizona Univ., Tucson (USA). Dept. of Chemical Engineering). 26 Mar 1984. Contract FG22-82PC50794. 32p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84010691.

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The change in the catalyst activity during char-CO_2 and char H_2O reactions at 700°C and 800°C is investigated. The instantaneous rate depends on both catalyst concentration (K/C) and the internal porous structure of the solid. At low values of K/C atomic ratio, the rate increases sharply with the addition of catalyst. As catalyst concentration is increased, the rate first levels off and then decreases. The leveling off is attributed to the saturation of the surface with catalytic sites. The subsequent decrease in rate seems to be due to the plugging of micropores by catalyst deposits. The reaction rate changes significantly during gasification and drops sharply before gasification is completed. The drop in rate before total conversion can be explained by the catalyst accumulation and pore plugging. Another important reason for the change in rate during the gasification is the change in the solid surface area. The surface areas of the samples at various levels of conversion were measured using CO_2 adsorption at 25°C. The models which have been successful in representing the char porous structure under noncatalytic conditions were found inadequate for catalytic gasification at low conversions. Other important factors contributing to the variation in rate during conversion are the catalyst loss and the change in the catalyst/carbon ratio. A model is presented which combines the effects of these contributing factors and gives a satisfactory representation of the experimental data. 22 references, 17 figures, 1 table.

30136 **(DOE/PC/50802—T1) Gasification reactivities of coal and coal char. Project progress report, July 16, 1982-May 31, 1984.** O'Brien, W.S.; Chen, J.W. (Southern Illinois Univ., Carbondale (USA). Dept. of Thermal and Environmental Engineering). 11 Jun 1984. Contract FG22-82PC50802. 16p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012938.

The overall objective of this study is to develop a series of standardized test procedures which can be used to characterize: (a) the gasification reactivity of a coal during pyrolysis/devolatilization; and (b) the behavior of the char of that coal when it is gasified with hydrogen, steam or other reactive gases. The kinetic data measured during the reactivity-characterization tests will be correlated into reaction models which will predict the behavior of that coal in different coal gasification reactor designs. The measured reactivity values of different coals will be compared with the chemical, physical and petrographic characteristics of the coals to recognize any significant dependence relationships. During this report period, the laminar-flow, coal devolatilization-pyrolysis reactor has been designed and constructed. The reactor assembly is now undergoing cold-test operation to demonstrate confidence in the solids feeding rates and solids collection. Several preliminary studies have provided background and analytical experience in this project area. These studies have examined the effects of pyrolyzing conditions on the properties of the coal-char and the coal liquid products. One study of the effects of mineral matter behavior on the pyrolysis reaction of the coal has been completed. A mathematical model for the behavior of coal in a two-stage gasifier has been formulated and the coal-gas product composition predictions are now being evaluated regarding realistic trend patterns and boundaries. 3 figures.

30137 **(DOE/PC/60046—1) Enhanced coal liquefaction with ammonia and amines in single and binary solvent systems. Quarterly report, September 20-December 19, 1983.** Chen, W.Y. (Gulf South Research Inst., New Orleans, LA (USA)). 12 Jan 1984. Contract AC22-83PC60046. 24p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012287.

The program objective is to evaluate the process potential of coal liquefaction by using supercritical solvent systems. The solvent system will include at least one nitrogen-containing compound: ammonia or aliphatic amines. Recent discovery of the nucleophilic attack capability of nitrogen-containing compounds provides the incentive for this choice of solvent. Kinetics and thermodynamics of the process are examined. A tubing-bomb batch reactor has been designed, assembled and tested. The reactor is designed to allow independent control of temperature, pressure (solvent density) and residence time. Condensed products are separated into oil, asphaltene, preasphaltene, and residue fractions depending on their solubilities in hexane, benzene, and pyridine. A Louisiana lignite was used in the test runs. Results from subcritical ammonia experiments showed 2 to 4% conversion to ammonia soluble materials. Sequential elution of condensed products did not yield significant soluble compounds, but it confirmed a previous report on pore enlargement by ammonia. 29 references, 2 figures, 2 tables.

30138 **(DOE/PC/60053—T3) Socio-economics, subsidence, transportation and legal ramifications of potential coal liquefaction plant sitings. Second quarterly report, January 1-March 31, 1984.** Rose, A.Z. (West Virginia Univ., Morgantown (USA). Dept. of Mineral Resource Economics). 1984. Contract FG22-83PC60053. 45p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011493.

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The potential impacts of a coal liquefaction plant on the surrounding site are being evaluated with the aid of a present input-output analysis matrix for West Virginia, the effects of ground subsidence resulting from the required coal mining, the effects of transport cost on coal sources and legal aspects. Socio-economic aspects are emphasized. (LTN)

30139 **(DOE/PC/60799—1) Volatiles mass transport with particles of softened coal. Technical progress report, July 27-October 26, 1983.** Howard, J.B.; Oh, M.; Peters, W.A. (Massachusetts Inst. of Tech., Cambridge (USA)). Dec 1983. Contract FG22-83PC60799. 17p. (FE-MIT—60799-1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84010863.

In the present work, a model for intra-particle chemical reactions, volatiles transport, and coal plasticity has been developed. The summary of the model description and its preliminary predictions are discussed in this report. Through the preliminary analysis of the model, the physical parameters of importance in the model are identified. Experiments to study these parameters are discussed. 16 references, 3 figures.

30140 **(DOE/PC/60803—3) Thermodynamic behavior of coal liquids in the presence of coal solids characterization of IOM and ASH. Third quarterly progress report, February 1, 1984-May 1, 1984.** Holder, G.D.; Klara, S.M. (Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering). May 1984. Contract FG22-83PC60803. 17p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012697.

Experiments have been conducted with the pure component systems of benzene, tetralin, toluene, and distilled water in order to verify that the system is producing accurate experimental results. The vapor pressure of these systems was measured as a function of temperature over a range of 0°C to 350°C. The vapor pressures obtained experimentally were compared with those obtained from literature using Antoine's Equation and Perry's Chemical Engineering Handbook. As can be seen in Figures 1 through 4, the experimental and literature values compared well with a maximum absolute error of less than 1 psia. The vapor pressure of the binary system of toluene-benzene was measured at various concentrations over a temperature range of 0°C to 350°C. The total reactor volume of the equilibrium cell is 70 ml. First, it was necessary to determine if equilib-

rium was obtained. Two trial runs using a liquid mole fraction of benzene equal to 0.56 were undertaken with 30 ml and 50 ml total volume samples, respectively. As can be seen in Figure 5, the difference in the total pressure of the system for the two different volumes was negligible. 13 figures.

30141 **(DOE/PC/60804—T3) Thermophysical properties correlations and pseudocomponent characterization parameter estimation for fossil fluids. Third quarterly report, March 1, 1984-May 31, 1984.** Starling, K.F.; Lee, L.L.; Ellington, R.T.; Watanasiri, S.; Brule, M.R.; Kumar, K.H.; Khan, M.A.; Langenberg, M.A.; Mannan, M..; Sheth, K. (Oklahoma Univ., Norman (USA). School of Chemical Engineering and Materials Science). 1984. Contract FG22-83PC60804. 55p. NTIS, PC A04; 3; GPO Dep. Order Number DE84012751.

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A modified Local Composition Model (MLCM) for the accurate prediction of viscosity of multicomponent mixtures has been presented. The model contains two adjustable parameters per binary pair. No additional parameters are necessary for extension to multicomponent mixtures. It is shown that with the introduction of this modified definition of LCM, Scott's two fluid theory, originally developed for the prediction of equilibrium thermodynamic properties such as Gibbs energy, can successfully be applied for predicting non-equilibrium transport properties such as viscosity. It is also shown that the same model is capable of predicting viscosity for vapor phase as well as liquid phase mixtures. Predictions based on the model for several binary mixtures, including those in which strong associating forces prevail, show excellent agreement with the experimental data. Percent Average Absolute Deviations (%AAD) obtained are less than 1.5% for vapor phase and less than 5% for liquid phase. Application to a vapor phase ternary system containing polar constituents yields %AAD less than 1.2% with maximum deviation at any particular composition being less than 3.2%. Comparison of these results with Conformal Solution Model (CSM) certainly indicates supremacy of LCM over CSM for strongly non-ideal systems. 21 references, 5 tables, 18 figures.

30142 **(DOE/PC/63032—T3) Bench-scale development of the TRW process for cleaning coal (Gravimelt Process). Quarterly technical progress report, February 1984-May 1984.** (TRW, Inc., Redondo Beach, CA (USA)). May 1984. Contract AC22-83PC63032. 24p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012696.

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This report presents progress for the third quarter of performance on Contract Number DE-AC-83-PC63032. The effort includes Tasks 6 through 13 of a continuing program to demonstrate the TRW Gravimelt coal cleaning technology. The technical effort this quarter was concentrated in three areas: design, fabrication and installation of a four-stage countercurrent flow reactor system, evaluation of regeneration concepts for spent caustic and spent acid wash water and filtration studies involving installation and operation of a commercial bag filter. Thus, the process development activities have entered an equipment evaluation and regeneration testing phase. 4 figures, 1 table.

30143 **(EPRI-AP—3499) Low-purity oxygen production study. Final report.** Bernstein, J.T. (Cryogenic Consulting Service, Inc., Weston, CT (USA)). May 1984. 49p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920360.

This study investigated reducing oxygen production costs in large plants that use coal gasification-combined-cycle (CGCC) for electric power generation, particularly as related to the production of oxygen at purities lower than high-purity (99.5%) oxygen. It was concluded that improvements in the thermodynamic efficiency of the air distillation that are not practical for 99.5% oxygen can be accomplished at oxygen purities of 95% or lower. An oxygen purity of about 95% appears to be optimum for improved oxygen plants for the CGCC application. A reduction in oxygen production costs of about 9% relative to high-purity oxygen production and 6% relative to 95% oxygen production in conventional plants was projected for a nondevelopmental, improved process. Further improvements may be possible through development of improved equipment or through integration of the improved processes with the gas turbine cycle.

30144 **(IEA/EAS—E3/82/4) Cost of liquid fuels from coal. Part IV. Products from direct liquefaction processes.** Hemming, D.F.; Holmes, J.M.; Teper, M. (IEA Coal Research, London (UK). Economic Assessment Service). Oct 1983. 89p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84901381.

This report presents the results of an EAS evaluation of the three most developed direct liquefaction processes - Exxon Donor Solvent (EDS), Hydrocarbon Research's H-Coal, and German liquefaction technology; and it indicates the possible economic effect of second generation processes (mainly variations of two-stage liquefaction). In order that the results of this study should be comparable with Parts II and III, we have made, as far as possible, the same assumptions and used the same capital cost data. We have considered the EDS process in the greatest detail and have investigated the economic impacts of different process configurations, different coals and different by-product values. We have also estimated the cost of upgrading the raw EDS liquids to gasoline. The economics of a plant based on H-Coal technology have been compared with EDS economics. For German technology we have only been able to obtain limited economic data for plants using German (Westerholt) coal and Victorian brown coal and thus we are not able to fully compare German technology with the US processes. Finally, we have compared the economics of these processes with a hypothetical advanced liquefaction process having a higher thermal efficiency and lower capital cost. Direct liquefaction of coal to gasoline in Europe or North America is not competitive with gasoline (from crude oil) priced at around $42/bbl or $350/t. At a national level factors outside the scope of this study should be considered: security of supply; the possible effect of even a small, independent and expandable supply of liquid fuels on the market price of petroleum; and the effect of local production on employment levels.

30145 **(NP—4770304) Consequent reactions of carbonized coal products under hydrogen pressure.** Morschett, F. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen). 14 Jul 1982. 161p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84770304.

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The tar-containing crude gas produced during coal gasification with a Lurgi gasifier is led to a crude gas cracking reactor where the carbonized products together with hydrogen are cracked to give methane. Since the exact composition and thus the degradation reactions are not know the reactions are simulated using model substances. Methyl substituted aromatics, naphthalene, benzene and phenol, as well as the intermediate products ethene, ethane and methane serve as model substances. The reaction parameters which are varied are pressure, temperature, retention time and hydrogenating gas composition. At pressures up to 100 bar and retention times of 1-20s, of the aromatics only benzene is formed at temperatures below 700°C. Only at temperatures above 800°C are the end products ethane and methane formed.

30146 **(NP—4770305) Catalytic influence of inorganic coal compounds on the gasification of coals with hydrogen and water vapor.** Krauss, W. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemie). 3 Jun 1982. 126p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84770305.

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Coal gasification studies were carried out using coals of different rank, pre-treated coals and model substances in a pressure gasification reactor with hydrogen, hydrogen/steam, and inert gas/steam as gasification medium. Pressure and temperature were varied between 2 and 20 bar and 790 and 1010°C respectively. It was found that the iron either already present in the coal or later added to it acts catalytically in the formation of methane and carbon monoxide. A pre-requisite however was initial desulfurization of the iron sulfide mineral and a reduction to produce catalytically-active iron. The desulfurization was promoted by the presence

of earth alkali or metal alkali salts. The products of reaction could be optimized by variation of the test parameters.

30147 **(NP—4770308) Experiments on the extraction of fuels in aqueous suspension at under to over critical conditions.** Nguyen Huu, U. (Hannover Univ. (Germany, F.R.). Fakultaet fuer Maschinenwesen). 30 Jun 1981. 182p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE84770308.

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Hydrocarbon-containing material such as hard coal through to biowaste in treated with carbon monoxide in aqueous suspension. The required quantity of hydrogenating hydrogen is formed via the water-gas reaction. The experiment was carried out in the above-critical range for water, the reaction and yields being determined by variation in temperature, reaction time, pressure, mashing proportions additives and type of reaction gas. Excess water led to an increase in yields. Elevated temperatures led to increased conversion and yields. Similarly a longer reaction time or elevated pressure increased conversion. In addition to various hard coals the following were studied: brown coals, peat, bagasse, and paper spent liquor, whereby the critical temperature was not exceeded for the last three.

30148 **(NP—4770309) Coal gasification in a pig iron bath; its future technological and economical possibilities.** Mietzner, J. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 12 Dec 1980. 136p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84770309.

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The coal gasification plants operating today do not produce enough synthesis gas to meet the needs of large methanol plants. This situation can possibly be alleviated by the system of coal gasification in a pig iron bath since the reactor dimensions can be designed on a larger scale of advantage is the simultaneous desulphurization of the gas. The energy balance can be improved by a coupling of pig iron bath-coal gasifier, direct reduction plant and electro-steelworks.

30149 **(NP—4770310) Utility of the properties of salt and water systems at high pressures for catalytic coal gasification.** Wenger, M. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Ingenieurwissenschaften). 28 Jul 1981. 158p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84770310.

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Alkaline earth salts and alkali salts were used as catalysts in the gasification of coal to produce synthetic natural gas. These catalysts were either mixed into the coal, or the coals were soaked with aqueous solutions thereof. A further possibility was steam gasification at low pressures with a solution of the catalyst in the steam. High pressures are necessary to dissolve sufficient catalyst in the steam and in order to avoid these in the reactor the catalyst is initially dissolved in the steam at high pressures and then the pressure released to the low reactor pressure. Potassium carbonate proved most suitable as catalyst. Other reaction parameters were also studied such as charge stock height, temperature, pressure and flow rate of the steam, together with the kinetics of the reaction products.

30150 **(ORNL/TM—8916) Industrial hygiene monitoring of gaseous, liquid and particulate matter releases at the Catlettsburg, Kentucky H-coal facility: results and evaluation.** Watson, A.P.; Hawthorne, A.R.; Vo-Dinh, T.; Griest, W.H.; Dreibelbis, W.G.; Gammage, R.B.; Van Hoesen, S.D.; Jenkins, R.A.; Klein, J.A.; Schuresko, D.D. (Oak Ridge National Lab., TN (USA)). May 1984. Contract AC05-84OR21400. 119p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84011826.

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Industrial hygiene data collected during periods of normal operation of the Ashland Synthetic Fuels, Inc. (ASFI) H-Coal Pilot Plant at Catlettsburg, Kentucky between February, 1981 and November, 1982 are summarized. Atmospheric monitoring characterization of area and fugitive emissions as well as the results of personal sampling during workshifts are presented. Field testing of several pieces of experimental detection equipment, including the derivative ultraviolet absorption spectrometer (DUVAS), lightpipe luminoscope, passive PNA vapor monitor and portable fluorometric monitor (spill spotter) displayed good potential for a more precise evaluation of potential worker exposure than has heretofore been possible. Comparability with standard methods was also good. Special studies evaluating work-clothing laundry effectiveness, degree and extent of skin contamination, permeability of gloves and glove coatings, possible induction of mutagenicity in body fludids of process workers and real-time detection of light molecular weight mercaptans and sulfurous compounds were also performed and summarized here. Research and development needs in worker protection and new understandings of industrial hygiene exposure results for the H-COAL design are provided in the final sections.

30151 **(PB—84-158336) Process gas chromatography study of a Selexol acid gas removal system. Final report Mar-Sep 82.** Williams, W.A. (Radian Corp., Austin, TX (USA)). Jan 1984. 81p. NTIS, PC A05/MF A01.

The report gives results of continuous compositional monitoring by process gas chromatography (GC) for three gas streams associated with the Selexol acid gas removal system at the Bi-Gas pilot plant in Homer City, PA. Data were obtained from the inlet and outlet streams of the Selexol system during tests in April and May 1982. Product gas composition data were logged for 55 hours of plant operation. The Bi-Gas pilot plant, utilizing a two-stage, entrained-bed, high-pressure slagging gasifier, produces a product gas that is low in tars and heavy oils. This gas stream required very little cleanup prior to instrumental analysis. However, some problems were encountered in the analysis of the Selexol acid gas stream due to the presence of high levels of naphthalene. The process gas chromatographs performed well and remained very stable during the tests. Material balances based on GC analyses and process flow rate data show a high degree of material accountability. The H_2S removal efficiency of the Selexol absorber was about 99% during the tests.

30152 **(SAND—84-0607) Model compound microreactor for determination of catalytic activity.** Trudell, D.E. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1984. Contract AC04-76DP00789. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84013319.

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A microreactor was developed for model-compound catalytic-activity and test procedure studies in order to determine the effects of catalyst fouling, poisoning, and aging on catalyst activity during direct coal liquefaction processing. The microreactor can be run at temperatures to 400°C and pressures to 1000 Torr. Catalytic activity is measured on a 0.200 gram catalyst sample. Activity determinations for hydrodesulfurization (HDS), hydrogenation (HYD), or cracking (CRK) are made using thiophene, 1-hexene, and 2,4,4-trimethyl-1-pentene respectively. Gas phase reactants are produced by saturating hydrogen at 0°C with model compound using a series of gas bubblers. Catalytic activity is based on model compound conversions, calculated using the area under the peaks of interest obtained by flame ionization gas chromatography.

0105 By-products

30153 **(DOE/AD/11151—1) Effect of US coal exports on domestic economic growth and on US national security.** (Faucett (Jack) Associates, Inc., Chevy Chase, MD (USA)). Jan 1984. Contract AM01-81AD11151. 102p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84013194.

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This document reports an investigation of possible US policies designed to increase US coal exports and the international coal trade; to benefit the US economy by increasing coal mining and transportation; and to improve the US strategic position by decreasing the dependence of our allies and less developed countries on oil and gas from OPEC and Communist countries. The study considered only situations in which coal replaces imported oil or natural

gas in the period 1983-2000. In 1982 US coal exports to countries other than Canada totaled 88 million tons. The total employment generated by these exports is estimated at about 150,000 jobs with income of 3.8 billion dollars. The United States will participate in any increase in the world coal trade, so policies that encourage substitution of imported coal for imported oil or natural gas will benefit US coal exports. Such policies also will benefit the US strategic position by decreasing the influence of OPEC and Communist countries on importers of oil. The report considers policies applicable to (a) developed nations of the world that lack sufficient coal resources of their own, (b) the developing nations that have adequate coal reserves that can be developed, and (c) the developing nations that do not have sufficient indigenous coal. Nations are listed for each category, and policies are presented for a case study country in each category. Among the most important policies are the expediting of r and d leading to economical methods of burning coal-oil and coal-water slurries and methods of fluidized bed combustion to control pollution. Other important policies are those which persuade potential coal importing countries that the United States has a firm national policy to encourage coal consumption and will continue to export coal to nations who need it.

30154 **(PB—84-144476) Anode carbon from buller coal, New Zealand.** Marshall, T. (Department of Scientific and Industrial Research, Petone (New Zealand). Industrial Processing Div.). Aug 1983. 154p. NTIS, PC E08/MF E01.

The Stockton portion of the Buller Coalfield, on the West Coast of the South Island, New Zealand, is located on a plateau about 1000 m above sea level and 20 km from the bar-harbour town of Westport. Stockton has a history of more than 100 years of coal mining, but at present this is confined to open-casting. The Buller coal deposits have attracted attention for specialist carbon production over a period of more than 30 years, and in 1981 a Task Force was set up by the Ministers of Energy and Science to examine the feasibility of setting up an industry to produce anode carbon from these coals. Events leading to this decision are summarized.

0106 Properties

REFER ALSO TO CITATION(S) 30121, 30213, 31319, 31564, 31565

30155 **(DOE/FE/05157—5) Coal conversion systems technical data book.** (Institute of Gas Technology, Chicago, IL (USA)). Mar 1984. 1311p. NTIS, PC A99/MF A01; 1; GPO Dep. Order Number DE84012890.

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This is an extensive data compilation involving: the physical, chemical, thermodynamic and combustion properties of coal, chars, ashes, slags; equilibrium data of certain pure liquids and their vapors, including their properties; similar properties for many hydrocarbons; building materials; fluidized-bed combustion; standard methods of analysis and testing coal; equations of state (second virial coefficient and its temperature derivatives); boiler tests; combustion properties of coal liquids; etc. Some earlier parts of this compilation were identified as HCP/T2286-01/5. (LTN)

30156 **(DOE/FE/60181—89) Physical properties and moisture.** Hauserman, W.B. (North Dakota Univ., Grand Forks (USA). Energy Research Center). May 1984. Contract FC21-83FE60181. 29p. (CONF-8406121—3). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012924.

From Contractors' conference - DOE advanced research and technology development program; Pittsburgh, PA, USA (5 Jun 1984).

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This is an interim report of work done to identify and define numerically a group of coal properties relating the structural integrity and intrinsic moisture content of coals. It represents work for the first time approaching a possibility of correlating properties formerly considered as completely unrelated subject areas. The data are still preliminary but demonstrate productive experimental techniques for further insight into the physical and molecular structure of coals. The only firm conclusion to be drawn from the friability and dielectric data together is that both are simple, numerical techniques to characterize and compare coals with respect to their mechanical structure and mode of intrinsic moisture attachment. Each provides sets of several variables, whose full significance can only be established after expanding the data base to include more coals, with more replications for statistical validity. The accomplishment to date consists of demonstrating that such data are possible. 10 references, 16 figures.

30157 **(DOE/FE/60181—91) Distribution of inorganics in low-rank coals.** Benson, S.A. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1984. Contract FC21-83FE60181. 10p. (CONF-8406121—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012923.

From Contractors' conference - DOE advanced research and technology development program; Pittsburgh, PA, USA (5 Jun 1984).

The inorganic components of low-rank coals have been examined to determine the differences in the modes of occurrence of major elements in high- and low-fouling coals and to examine the associations of minor and trace elements with minerals and organic fractions of the coals. The interrelationships of the inorganic elements and organic components have been determined by a combination of chemical fractionation, mineralogy by LTA/XRD and SEM, carboxylic acid group analysis, and statistical correlations. The modes of occurrence of inorganic components can be related to the mineral transformations that occur upon ashing the coals at 750° and 1000°C. The ashes produced from the high-sodium coals exhibit a quite different behavior compared to the low-sodium coals. The ashes were examined by x-ray diffraction. A low melting phase was identified in both high-sodium coals but not in the low-sodium coals (solid solution aluminosilicate (melilites) with a general formula $(Na,Ca)_2(Mg,Al)(Al,Si)_2O_7$). These phases form in silica deficient systems. Melilites have been identified in the matrix materials of ash deposits formed during the combustion of high-fouling coals. The high-fouling coals are characteristic of higher concentrations of organically bound sodium and calcium and lower concentrations of silicon and aluminum. This pattern of concentrations appears to be the key to the formation of the melilites. By comparison, the low-fouling coals are relatively very high in silicon and slightly higher in aluminum along with being in sodium and calcium. Ashes of this type are more likely to form higher melting species, presumably less prone to form boiler tube deposits. 19 references, 3 tables.

30158 **(DOE/FE/60181—97) Ash and slag characterization for low-rank coals.** Schobert, H.H. (North Dakota Univ., Grand Forks (USA). Energy Research Center). May 1984. Contract FC21-83FE60181. 9p. (CONF-840695—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012922.

From 4. annual advanced gasification contractors' meeting; Morgantown, WV, USA (26 Jun 1984).

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Inorganics in low-rank coals are found in three major modes: ion exchangeable salts of the humic acid groups; mineral phases that are acid soluble, such as carbonates and some oxides; and insoluble minerals such as clays, quartz, and pyrite. The variation in association of inorganics has an effect on their fate during ashing. Determination of the extent to which inorganics are lost and mineral phases change during a carefully controlled set of ashing conditions is very important in understanding what changes may occur during coal processing and how such changes are related to process conditions. Numerous attempts have been made to develop empirical equations for calculating the viscosity-temperature relationship for coal ash slags from their composition. Since the composition of low-rank coal slags differs significantly from bituminous slags, the predictive equations in the literature often fail to give valid trends when applied to low-rank coal slags. Thus, a data base of experimentally determined viscosities of low-rank coal slags is required, combined with chemical or mineralogical characterization of the melts. This data base would then be used for the development of appropriate equations specific to low-rank coal slags. As research, development, and design work continue on slagging processes for combustion and gasification, it is increasingly important to have data on other thermophysical properties of low-rank coal slags, such as the surface tension, specific heat, thermal conductivity, and diffusivity. Determination of these properties requires the develop-

ment of appropriate high-temperature equipment for property measurement, the compilation of a data base for a suite of low-rank coal slags, and the correlation of these properties with composition.

30159 **(DOE/LC/10821—T1) Synthesis of indanes, tetralins and carotanes, and characterization of indanes and tetralins. Final report, May 1, 1982-April 30, 1984.** Watt, D.S. (Wyoming Univ., Laramie (USA)). Apr 1984. Contract AS20-82LC10821. 57p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84011216.

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General routes for the preparation of 1- and 2-alkylindanes from indanone and the preparation of 4- and 5-alkylindanes from the corresponding bromoindenes have been developed. Similar approaches for the preparation of various alkylated tetralins have been developed. Infrared, NMR, and mass spectra, as well as melting points were obtained for the synthesized indanes and tetralins. Synthesis of a diastereomeric mixture of perhydro-β-carotanes from β-carotene has been undertaken. A stereorational synthesis of other carotenes has also been initiated using a new enantioselective synthesis which employs steroids as chiral auxiliaries. 58 references, 2 figures, 5 tables.

30160 **(DOE/PC/40789—T10) Thermal and radiative properties of coal-ash deposits. Technical progress report No. 10, March 1-May 31, 1984.** Anderson, D.W.; Vader, D.T.; Incropera, F.P.; Viskanta, R. (Purdue Univ., Lafayette, IN (USA). School of Mechanical Engineering). 1984. Contract FG22-81PC40789. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012744.

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In the last progress report, the failed attempt at Experiment II.F on solid coal slag deposit was discussed. Improvisations were made and the experiment was successfully performed in the last quarter. The two faulty pieces of deposit were crushed into particles and used alongside the five solid slag pieces. Two thirds of the total sample was therefore solid, with one third particulate (particle size less than 500 μm). Such a hybrid arrangement was necessary due to a limited amount of the solid, single-piece slag available to work with. The experiment was performed in two phases. In the first phase, surface temperatures were limited to 1255°C to investigate the effects of sintering and thermal history without melting the sample. Temperatures were increased to 1365°C in the second phase, producing a rather irregular melt. Sample thickness decreased from 19.7 mm to 13.6 mm, a decrease of 31%. Thermal conductance results are presented. The values are higher than any of the particulate samples studied previously. A follow-up experiment with particulate ash from approximately the same source will be performed in the future and results compared with those of this experiment. Differences will be attributed to the difference in physical structure, i.e., solid porous or particulate ash. 1 figure.

30161 (DOE/PC/40789—T10, pp 19p, Appendix) **Thermal conductance of coal-ash deposits.** Anderson, D.W.; Viskanta, R.; Incropera, F.P. 1984. NTIS, PC A02/MF A01. Order Number TI84012744.

In Thermal and radiative properties of coal-ash deposits. Technical progress report No. 10, March 1-May 31, 1984.

Experiments have been performed in a facility designed for steady-state heat transfer measurements in coal ash deposits obtained from utility boilers. High temperatures in the ash samples wre achieved by subjecting one surface to intense irradiation from an electric kiln. A water-cooled calorimeter and accompanying thermal guards located below a substrate plate supporting the sample served as a low temperature heat sink. The one-dimensional heat flux through the sample was measured calorimetrically. The test facility, experimental methods, and experimental results are discussed. Measurements were made for both flyash and crushed slag deposit samples, with hot surface temperatures ranging from 425 to 1395°C, and surface irradiation from 23 to 500 $kW.m^{-2}$. Overall thermal conductances (including conduction and radiation transfer) were low, typically below 0.5 W/m.K for a 20 mm thick sample. Temperature profiles for the samples were determined using small diameter thermocouples located in the sample interior. Particle sintering and melting have been found to affect temperature profiles and thermal conductances. Samples which underwent partial melting experienced irreversible changes in thermal conductance. Local thermal conductances within the samples showed this effect clearly, increasing as much as six-fold. 24 references, 7 figures.

30162 **(DOE/PC/50797—T6) Novel analytical approaches to coal beneficiation. Quarterly report.** Griffiths, P.R. (California Univ., Riverside (USA)). 30 May 1984. Contract FG22-82PC50797. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012941.

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The work described in this quarterly progress report concerns our initial attempts to develop alternative or complementary methods to infrared spectrometry for determining the concentration of functional groups in coals. In our previous work, we had shown that it appears to be possible to assign several features in the diffuse reflectance (DR) infrared spectrum of coals after the widths of each had been reduced by Fourier self-deconvolution (FSD). Bands were assigned to various C-H groups such as CH_3-R (R=alkyl), CH_3-Ar (Ar=aryl), CH_3-O-, CH_3-CO-, -CH_2-R, -CH_2-Ar, -CH_2-O-, -CH_2-CO-, and aromatic C-H groups in mononuclear and polynuclear rings. Many of the assignments were made on the basis of variations of relative band intensities of a series of coals with rank and the behavior of band intensities for a given coal during air oxidation. Confirmation of these assignments by comparison with spectra measured using a complementary spectroscopic technique, such as NMR spectrometry, is vital. Cross polarization/magic angle spinning ^{13}C NMR spectra of powdered coals do not have sufficient structural detail to be useful for this purpose, and their signal-to-noise ratio is too low to permit resolution enhancement by FSD. We therefore decided to investigate the feasibility of using the chloroform extracts to determine the concentration of the same functional groups that had been previously investigated by DR spectrometry. This report describes our preliminary results. 2 references, 10 figures.

30163 **(DOE/PC/50813—5) Effects of stresses on optical and chemical properties of coal. Technical progress report, August 1, 1983-October 31, 1983.** Ting, F.T.C. (West Virginia Univ., Morgantown (USA). Dept. of Geology and Geography). 1984. Contract FG22-82PC50813. 3p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012802.

The objectives of the research are to investigate the effects of natural stresses and laboratory induced stress conditions on the optical properties, carbonization behavior; and chemical properties of coal. The naturally and artifically strained coals are examined for signs of any rotation of optical axis, any changes of carbonization behavior as observed under hot state and other testing conditions. Four milligram of vitrain sample was heated to 250°C in a furnace at 28°C min heating rate. The total amount of material evolved thermally and detected by the gas chromatograph with flame ionization detector (FID) is called the Total Organic Content (TOC). TOC decreased with increase of rank, and was strongly affected by the anisotropism of coal being high in weakly anistropic coals and low in strongly anisotropic coals. The reasons for the differences in thermal evolution yield (TOCg) for different anisotropic coals are not known. Yet it strongly suggests that the adsorption characteristics of different anisotropic coals are different and may reflect variations in internal arrangement of macromolecules (micelles) of coal caused by variations in asserted stresses during coalification processes. 1 figure.

30164 **(IS-M—463-Rev.1) Methods for sulfur in coal. Revision 1.** Markuszewski, R. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 10p. (CONF-831039—1-Rev.1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012139.

From International coal testing conference; Lexington, KY, USA (24 Oct 1983).

Conventional methods for the determination of total sulfur in coal as practiced presently in research and commercial laboratories are reviewed. The widely accepted procedures for total sulfur, e.g., Eschka ignition, bomb washing, and high-temperature combustion, are examined in detail, and less common procedures such as the oxygen flask method, rapid dissolution methods, and some instru-

mental methods are discussed. The ease, reliability, and availability of testing procedures and apparatus and various finishing methods (e.g., titrimetric, gravimetric, turbidimetric, or instrumental) are compared. New techniques which are mostly instrumental but which show promise for future development are explored. Some of the advantages and disadvantages of each method are pointed out, the limitations, difficulties, or pitfalls are highlighted, and research needs for further development of rapid new techniques, such as on-line methods, are summarized. 14 references.

30165 **(PB—84-145820) Coal analysis in New Zealand.** Gray, V.R. (New Zealand Energy Research and Development Committee, Auckland). Sep 1983. 81p. (R—97). NTIS, PC A05/MF A01.

Coal analysis methods and facilities in New Zealand are barely adequate for the present small scale industry, but will require improvement to supply the quality control and specification which are going to be needed to support an expanded and modernized coal industry. A set of national standards for coal analysis and testing needs to be reestablished and laboratories should be upgraded to be able to seek registration with the New Zealand Testing and Laboratory Registration Council (TELARC). The bulk of the report consists of a detailed survey of the various standard test methods, to provide a basis for a fresh set of New Zealand Standards for the analysis and testing of coal. New Zealand Laboratories equipped for analysis and testing of coal are listed.

30166 **(VTT-TUTK—232) Development of sampling method for milled peat.** Impola, R.; Okkonen, J. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Nov 1983. 86p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751466.

This price of peat is generally determined by its energy content which again depends on the moisture of peat and the heat value of dry peat. To determine these qualities we have to take samples of peat. Sampling is now done manually. Consequently the errors caused by the human factor can be unproportionally large. We can avoid systematic errors in sampling by developing automatic sampling and sample handling methods. However, as manual sampling is not to be abandoned in the near future, we have in the investigation sought optimum solutions also for this sampling method. The number of samples, volume of sample, sampling place and method and handling of samples have been evaluated. By making the manual sampling as systematic as possible we can reach better results. One object for study was the moisture distribution of the milled peat layer on a conveyor belt, primarily as a function of belt width. The differences in moisture distribution observed wre so large tha, when samples are taken from a moving peat flow, the sample must represent the cross section of the whole peat flow. When samples are taken directly from the load, it difficult to obtain representative samples.

30167 **Elemental partitioning in ash depositories and material balances for a coal burning facility by spark source mass spectrometry.** Conzemlus, R.J.; Welcomer, T.D.; Svec, H.J. (Ames Lab., IA). *Environmental Science and Technology;* **18**: No. 1, 12-18(Jan 1984). Contract W-7405-ENG-82.

Spark source mass spectrometry (SSMS) is shown to be an excellent analytical tool for determining enrichment factors and a useful tool for measuring material balances for a coal burning facility. Enrichment and material balance are measured for 62 elements in an Iowa and a Colorado coal by using SSMs as the sole analytical technique. Copper was used as an internal reference. The elements As, Cd, Ga, Ge, Pb, Sn, Tl, and Zn were found to be highly partitioned in the various ash depositories and Bi, Cs, Cu, I, Mo, Na, Se, Ta, and W were partially partitioned. The halogens, Hg, S, and Se were found to be lost to the stack. One-third of the elements studied for material balance gave an influent/effluent ratio agreeing within 30% of unity. Systematic errors are noted in relative sensitivity coefficients, used for instrument calibration, for some of the elements and between coal and ash samples.

30168 **Fly ash characteristics relevant to utilization, health precautions and environment considerations.** Raask, E. (Central Electricity Generating Board, Leatherhead, England). pp 159-170 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Coal silicate minerals in pulverized fuel undergo vitrification and spheroidization in the flame, and on subsequent cooling partial re-crystallization takes place. As a result, the silicate particles between 0.5 and 50 μm in diameter, which make up the bulk of fly ash consist chiefly of micro-crystals and needles dispersed in a glassy matrix. The surface vitrification of quartz results in a marked reduction of cytotoxic reactivity of the ash particles. Fly ashes from bituminous coals usually give first feebly acidic reaction, but the solution becomes alkaline within a few minutes as a result of alkali-metals and calcium being leached from the glassy alumino-silicate particles. 31 references, 4 figures, 1 table.

0108 Waste Management

REFER ALSO TO CITATION(S) 30120, 30168, 30180, 30181, 30224, 30651, 30652, 31092, 31671

30169 **(CONF-8405154—3) Fixed-film, fluidized-bed bioreactors for biooxidation of coal gasification wastewaters.** Donaldson, T.L.; Strandberg, G.W.; Hewitt, J.D.; Shields, G.S. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 18p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012341.

From American Institute of Chemical Engineers spring national meeting; Anaheim, CA, USA (20 May 1984).

Fixed-film, fluidized-bed bioreactors have been used successfully to treat dilute synthetic wastewaters on a continuous basis for more than 1 year and dilute actual coal conversion wastewaters for 9 months. The bioreactors have exhibited stable biological activity, and no difficult operating problems have been encountered. Efiluent phenol concentrations of $\leq$ 1 mg/L have been obtained using synthetic wastewater containing 30 to 40 mg/L of phenol. Volumetric reaction rates in the bioreactors are substantially higher than those in suspended growth systems (such as activated sludge) because of the high concentration of retained cells on the support particles. Bioreactor performance, batch kinetic studies, and development, characterization, and preservation of the microbial culture are described. 15 references, 2 figures, 7 tables.

30170 **(DOE/ET/15492—T53) Laboratory/bench scale testing and evaluation of APT dry plate scrubber. Seventeenth quarterly report, March 1-May 31, 1984.** (Air Pollution Technology, Inc., San Diego, CA (USA)). 21 Jun 1984. Contract AC21-80ET15492. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84013184.

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The objective of this project is to conduct a bench-scale experimental evaluation of the Dry Plate Scrubber (DPS) at high temperature and pressure to determine its potential for controlling particulate and alkali vapor emissions from pressurized fluidized-bed combustion (PEBC) processes. The technical objectives for this quarter were to: (1) complete all high temperature - DPS experiments; (2) continue work on PBBC-DPS process design; and (3) start DPS experiments for ash cake prevention. The heater element of the main air heater was returned to the manufacturer for redesigning of the elements and housing. Not much work was done on the process design, and DPS experiments were not started, because the pipe skin heaters were replaced and tested.

30171 **(DOE/FE/60148—T2) Evaluation of the NOXSO combined NO/sub x//SO_2 flue gas treatment process: process chemistry, reaction kinetics, sorbent performance, process design and cost analysis. Final report.** Tseng, H.P.; Haslbeck, J.L.; Neal, L.G. (NOXSO Corp., Paducah, KY (USA)). 30 Sep 1983. Contract AC22-82FE60148. 259p. NTIS, PC A12/MF A01. Order Number DE84001690.

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The NOXSO Process is a dry, regenerable system capable of removing both SO_2 and NO/sub x/ from flue gas generated by coal-fired utility boilers. Adsorption is accomplished at the normal post-airheater flue gas temperatures of around 120°C, and SO_2 and NO/sub x/ are simultaneously removed from the flue gas in a single step. Regeneration of the sorbent is accomplished at elevated temperature (≧ 550°C) using any of a number of reducing agents, e.g. hydrogen sulfide, hydrogen, carbon monoxide, methane, etc. Hydrogen sulfide was used in all the tests reported here. On regeneration, the compounds formed by the adsorption of SO_2 and NO/sub x/ are reduced to elemental sulfur and nitrogen. The NOXSO test program has the ultimate goal of determining the commercial potential of the NOXSO process. The specific test program conducted involves three basic tasks: fundamental studies to determine the process chemistry, kinetics and the influence of various parameters; sorbent studies to determine sorbent properties that contribute to low attrition and efficient sorption; and process studies that determine the physical size and the costs of a commercial facility. The report is organized accordingly. Chapter 2 is an Executive Summary of the entire report. Chapter 3 describes in detail the test facility, equipment and test procedures. Chapter 4 provides a detailed discussion of the process chemistry. Chapter 5 presents the kinetic model and supporting data. Chapter 6 gives the sorbent attrition data and ideas to explain the excellent performance of the NOXSO sorbent. Chapter 7 presents design guidelines for critical NOXSO process equipment. Chapter 8 discusses the economic study conducted by Science Applications, Inc. and the Appendix reproduces the SAI report. 5 references, 50 figures, 22 tables.

30172 **(DOE/PC/30320—T4) Coal desulfurization during the combustion of coal/oil/water emulsions: an economic alternative clean liquid fuel. Final report.** (Adelphi Research Center, Inc., Garden City, NY (USA)). Apr 1983. Contract AC22-80PC30320. 125p. NTIS, PC A10/MF A01; GPO Dep. Order Number DE84007574.

This report presents the Phase II results of a combustion program designed to assess the feasibility of utilizing coal/oil/water (COW) emulsions as a fuel for fire tube package boilers. Also examined was the effect of the addition of alkaline absorbents to the fuel for sulfur dioxide capture. Presented are the findings of testing involving optimizing sulfur dioxide removal while still maintaining a rheologically favorable fuel. Overall performance of COW as a boiler fuel was evaluated over long term operation. Emphasis was placed on burner design as well as coal characteristics. Three different bituminous coals were used during this program. Results indicate that COW emulsions may be a feasible alternative for oil in industrial fire tube boilers if the major problem, deposition buildup, can be resolved. This appears possible with a proper soot blower design. Soda ash is a viable means for obtaining at least 80% removal, using a 1:1 molar ratio. However, the deposition problem with soda ash indicated that stack injection may be a more feasible approach.

30173 **(IS-M—478) Recovery of alumina from fly ash: use of coal cleaning refuse as a mineralizer in the lime-sinter process.** Fronczak, N.R.; Burnet, G. (Ames Lab., IA (USA); Iowa State Univ. of Science and Technology, Ames (USA). Dept. of Chemical Engineering). 1983. Contract W-7405-ENG-82. 11p. (CONF-831244—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012840.

From 2. conference on municipal, hazardous and coal wastes management; Miami Beach, FL, USA (5 Dec 1983).

The efficiency of alumina recovery from coal fly ash by the lime-sinter process is improved by the addition of a small amount of coal cleaning refuse. Approximately 5.0 wt % refuse increases alumina recovery from 55% to 90% for subbituminous coal ashes and reduces the required sintering temperature from 1380 to 1200°C. Mixtures of fly ash and various amounts of coal cleaning refuse and limestone are sintered at different temperatures and lengths of time to determine the optimum processing conditions. X-ray diffraction analysis is used to obtain qualitative and quantitative information about the alumina compounds formed during sintering and to relate their formation to the amount of alumina recovered from the fly ash. Alumina compounds identified in the sintered mixtures are: calcium alumina ferrite (C_4AF), calcium aluminate ($C_{12}A_7$), calcium sulfoaluminate (C_4A_3S), and gehlenite (C_2AS). The C_4A_3S and $C_{12}A_7$ are soluble and account for 90 to 95% of the recovered alumina. The C_4AF and C_2AS are insoluble and remain in the solid residue. Other calcium aluminates such as CA or C_3A may form during sintering, but not in large enough quantities (less than 1 wt %) to be identified in the x-ray patterns obtained. The results of this work will be used for the further development and commercialization of the lime-sinter process for the recovery of alumina from coal fly ash. 11 references, 8 figures.

30174 **(NP—4770306) Hot gas desulphurization of combustion gases and reduction gases.** Weiskopf, H.J. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 28 Jul 1982. 122p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84770306.

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The results for desulphurization of calcium oxide, calcium carbonate, magnesium dioxide, calcined dolomite and natural dolomite were compared to values expected from thermodynamic considerations. It was shown that high temperatures were advantageous for still decomposable solids such as, for example, calcium carbonate. Quite the opposite effect was achieved with oxides, which thermodynamically desulphurize less well at higher temperatures. Desulphurization by magnesium carbonate or magnesium oxide is not possible, as revealed by further calculations for a model gas consisting of 10% carbon dioxide and 10% water vapour. In order to measure temperature dependence of desulphurization in a fixed bed for lime and limestone the temperature was varied in the range 400 to 1000°C, other conditions remaining the same. A strong dependence was established for the temperature range 400 to 700°C. Above 700°C the degree of desulphurization increased only marginally, reaching a maximum at 800°C; this temperature was increased to 900°C in studies carried out under elevated pressure. The H_2S loads calculated from theoretical curves were almost identical in the temperature range 800°C to 1000°C to results obtained in practice. Comparisons between dolomite, limestone, and lime revealed that dolomite and limestone are more reactive than lime. Under otherwise comparable test conditions a conversion of 13.74% was obtained for lime and a conversion of 22.30% for limestone.

30175 **(NP—4770312) Investigations on the wet collection of sulphur dioxide.** Schneider, H.F. (Hannover Univ. (Germany, F.R.). Fakultaet fuer Maschinenwesen). 22 Jan 1982. 122p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84770312.

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The wet collection of sulphur dioxide from outlet air in a Venturi scrubber and in a stretched lattice scrubber was investigated on a semi-technical scale in pilot plants. Water and dilute solutions of sodium and potassium hydroxide were used as scrubbing liquids. The results obtained have been presented in terms of the dependence on the test parameters orifice geometry, outlet air flow volume, scrubbing liquid/gas ratio, scrubbing liquid composition, and noxious gas entry concentration. The studies revealed that the degree of collection increased with scrubbing liquid load, concentration of alkaline solution and with falling concentration of novious gas entry. On the other hand an increase in outlet air flow volume led only to an increase in degree of collection in the stretched lattice scrubber. With the Venturi scrubber the curves pass through a maximum owing to the considerably shorter retention times. High collection levels could be achieved in both scrubbers through the implementation of basic scrubbing liquid. By in series connection of the two scrubbers the overall degree of collection could be increased, or alternatively for the same level the specific energy requirement could be significantly reduced.

30176 **DOE program in coal waste management.** Neal, J. (Dept. of Energy, Washington, DC). pp 1-9 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A review of the waste problem associated with increased coal use is given; waste management options are identified; and, the current DOE R & D activities in waste utilization and resource recovery are described. DOE-funded work conducted at Ames, Oak Ridge, and Los Alamos National Labs is summarized, including metals recovery by HICHLOR, direct acid leach, and various sintering processes.

30177 **Development of a computer model to estimate waste disposal costs.** Burnstein, D. (Engineering-Science, Inc., Atlanta, GA). pp 483-500 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Coal combustion wastes have historically had a relatively low sales value as a resource for recovery or reuse. The economic incentive for recovery or reuse must therefore come from a combination of the price received for the material plus the savings in waste disposal costs. Recent regulations promulgated under the Resource Conservation and Recovery Act (RCRA), PL 94-580 may change the traditional break-even points for resource recovery/reuse by increasing waste disposal costs. Engineering-Science (ES) was retained by the Department of Energy, Office of Coal Utilization and Extraction (DOE/OCUE) to provide an analysis of the potential impacts on utility fossil fuel-fired facilities that could result from the implementation of the RCRA regulations. A portion of this project involves the development of a computer model for estimating disposal costs for both hazardous and nonhazardous wastes. This paper presents a brief description of this model along with some examples of input and output reports.

0109 Environmental Aspects

REFER ALSO TO CITATION(S) 30116, 30190, 30212, 30683, 31028

30178 **(BEOP—25) Description of a standard leaching procedure for coal residues and waste materials.** van der Sloot, H.A.; Piepers, O.; Kok, A. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Dec 1983. 52p. (In Dutch). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84751414.

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The standard leaching procedure is described, which has been developed by the SOSUV group (working group for the development of standard leaching procedures for coal ash and similar materials). The test is applicable to coal ash and ashes resulting from waste incineration. As opposed to existing test methods a close relation with practice has been pursued to allow a better judgement of possible environmental effects from the test results. The test results give estimates for environmental effects, short term (less than 5 years), medium term (5 to 50 years) and long term (more than 50 years). For coal fly ash test results are given.

30179 **(CONF-8209235—Absts.) Acid rain: commentary on controversial issues and observations on the role of fuel burning.** Szabo, M.F. (PEDCO-Environmental Specialists, Inc., Cincinnati, OH (USA)). 1982. 41p. R.G. Ostendor, Procter and Gamble Co., 7162 Reading Road, Cincinnati, Ohio 45222. Order Number TI84901073.

From 39. annual meeting of the East Central Section of the Air Pollution Control Association; Cincinnati, OH, USA (22 Sep 1982).

This collection of abstracts addresses the following topics: coal utilization and acid rain; metropolitan and urban problems and industrial problems. Several abstracts are included under each of these topics.

30180 **(DOE/PC/40068—T5-Vol.1) Assessment of hydrocarbon and particulate emissions control and wastewater treatment technology for the solvent refined coal-II process. Volume I. Executive summary.** Benedek, K.; Courant, R.; DeLucia, D.; Horne, R.; Mohr, C.M.; Porter, J.H.; Ray, A. (Energy and Environmental Engineering, Inc., Cambridge, MA (USA)). Jun 1984. Contract AC22-81PC40068. 67p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84013196.

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The Solvent Refined Coal-II (SRC-II) process provides a significant alternative to importing oil by producing oil derived from our abundant coal reserves. The primary product of this process is a low-sulfur distillate fuel suitable for burning in utility boilers. On the basis of preliminary design and pilot plant data, controlling particulates and hydrocarbons from the SRC-II plant is of primary concern. In addition, wastewater treatment technology should be studied further, as only limited data were derived from the experience at the pilot plant. This report examines the SRC-II process utilizing the preliminary design developed by Stearns-Roger, Incorporated. That process design uses noncatalytic, direct hydrogenation to liquefy up to 6078 metric tons per day of coal. This report proceeds through a process description of the SRC-II process based on the Phase Zero SRC-II Demonstration Project, estimates the air pollutant emissions from point and fugitive sources, characterizes wastewater streams from the process, and discusses available control technologies which can be applied to the streams. The costs of the different control technologies are also discussed. Preliminary and detailed screening analyses were performed to investigate the air quality problems to plant personnel and the surrounding community. Potential health risks from particulates and hydrocarbon emissions have been assessed based on studies undertaken at different laboratories in the country. Finally, a summary of environmental impacts and control technology consideration is presented. The summary includes research and development needs in the area of emission factors, waste stream characterization and control technologies. 8 figures, 15 tables.

30181 **(DOE/PC/40068—T5-Vol.2) Assessment of hydrocarbon and particulate emissions control and wastewater treatment technology for the Solvent Refined Coal-II process. Volume II. Technical report.** Benedek, K.; Courant, R.; DeLucia, D.; Horne, R.; Mohr, C.M.; Porter, J.H.; Ray, A. (Energy and Environmental Engineering, Inc., Cambridge, MA (USA)). Jun 1984. Contract AC22-81PC40068. 323p. NTIS, PC A14/MF A01; 1; GPO Dep. Order Number DE84013197.

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The Solvent Refined Coal-II (SRC-II) process provides a significant alternative to importing oil by producing oil derived from our abundant coal reserves. The primary product of this process is a low-sulfur distillate fuel suitable for burning in utility boilers. On the basis of preliminary design and pilot plant data, controlling particulates and hydrocarbons from the SRC-II plant is of primary concern. In addition, wastewater treatment technology should be studied further, as only limited data were derived from the experience at the pilot plant. This report examines the SRC-II process utilizing the preliminary design developed by Stearns-Roger, Incorporated. That process design uses noncatalytic, direct hydrogenation to liquefy up to 6078 metric tons per day of coal. This report proceeds through a process description of the SRC-II process based on the Phase Zero SRC-II Demonstration Project, estimates the air pollutant emissions from point and fugitive sources, characterizes wastewater streams from the process, and discusses available control technologies which can be applied to the streams. The costs of the different control technologies are also discussed. Preliminary and detailed screening analyses were performed to investigate the air quality problems to plant personnel and the surrounding community. Potential health risks from particulates and hydrocarbon emissions have been assessed based on studies undertaken at different laboratories in the country. Finally, a summary of environmental impacts and control technology consideration is presented. The summary includes research and development needs in the area of

emission factors, waste stream characterization and control technologies. 40 references, 27 figures, 117 tables.

30182 **(IAEA-R—2717-F) Relative radiation hazards of coal based and nuclear power plants. Final report for the period 1 December 1980 - 14 February 1983.** Mishra, U.C. (International Atomic Energy Agency, Vienna (Austria)). Apr 1983. 25 p.p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701842.

Coal, like most materials found in nature, contains trace quantities of naturally occurring radionuclides. However, low concentrations may become important if large quantities of coal are burnt in thermal power plants. Therefore a study was performed to determine the radioactivity in coal, in fly-ash and slag and assess the importance of radioactive emissions from thermal power plants. The results were compared to the radiological impact of nuclear power stations. Based on these data, theoretical estimates for the population living within 80km from power stations indicate that the collective dose commitments of coal-fired plants are one order of magnitude higher than those for BWR-type nuclear plants. Measurements taken in the vicinity of coal-fired plants were comparable to those for nuclear plants, i.e. within the range of variation of natural background radiation in India.

30183 **(USGS-OFR—77-1) Preliminary investigation and feasibility study of environmental impact of energy resource development in the Denver Basin.** Kirkham, R.M.; Ladwig, L.R. (Colorado Geological Survey, Denver (USA)). 1977. 83p. USGS-OFS, Box 25425-Denver Federal Center, Denver, CO 80225. Order Number TI84901259.

The preliminary phase of the Denver Basin project is summarized in this report. There is a significant potential for further development of coal, lignite, uranium, petroleum, and natural gas in this area. If any or all of these energy resources are developed, the resulting environmental impact could have a profound effect on both the urban and agricultural environments. Furthermore, past urbanization has caused the loss of extractable energy resources.

30184 **Resource recovery of municipal wastewater sludge.** Joffe, D.J. (Engineering Service Associates, Inc., Atlanta, GA). pp 465-474 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Reclamation of surface mine spoil areas was proven possible by land application of composted anaerobically digested municipal sludge in Jefferson County, (Birmingham area) Alabama despite adverse conditions including erosion due to steep slopes, acidic soil conditions, extreme heat, and decreased precipitation over an eight month period. Composting followed by land application also proved cost efffective over incineration and co-disposal as a sludge treatment and an ultimate disposal alternative. The municipal sludge derived compost was shown to be an excellent soil conditioner and marketable to a local coal company. These conclusions were reached following a comprehensive sludge management study for Jefferson County, Alabama. One part of this study was a field investigation intended to test composting and the ability of compost to promote good vegetative cover in areas of harsh environments. 2 figures, 6 tables.

0110 Reserves And Exploration

REFER ALSO TO CITATION(S) 30155, 30256

30185 **(BMFT-FB-T—83-294) Further development of a noise logging system.** Beckmann, H.; Brandt, A.; Burkhardt, M.; Dickel, U.; Dockhorn, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 74p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84751254.

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Since German bituminous coal has an increasing significance in supplying the Federal Republic of Germany with energy, exploration and estimations of reserves especially are gaining in importance. This matter must be considered by developing new and improving existing geological techniques. The research program "Further development of a noise logging system" is concerned with the development and the testing of a combined noise and caliper log for small underground drillings. Scratch noises shall give information about the thickness of coal seams and data of clastic sediments. A geological interpretation of the noise analysis is supported by a simultaneous registration of the caliper. The standard logging program in coal drillings, like nuclear, acoustic and electric measurements, ought to be completed by phophokinetic measurements.

30186 **(DOE/EI/10142—T1) Evaluation of coking coals in Colorado. Resource Series 7.** Goolsby, S.M.; Reade, N.S.; Murray, D.K. (Colorado Geological Survey, Denver (USA)). 1979. Contract FC01-78EI10142. 145p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012122.

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Certain coals from the State of Colorado have long served as a major component for the manufacture of coke in the western United States. However, decision-makers in both private industry and in all levels of government have been hampered by the lack of a comprehensive and detailed statewide coking-coal resource evaluation. To alleviate this problem, a two-year project was initiated to evaluate the resources of coking coal in Colorado. Based on a precedent set by workers in the US Bureau of Mines and Department of Energy, a classification system was established to evaluate coking-coal resources in Colorado. The classification system uses coal ash and sulfur content and ASTM rank designations to categorize coal resources as being either premium (0 to 1.0% S, 0 to 3.0% ash), marginal (1.1 to 1.8% S, 8.0 to 12.0% ash), or latent (1.9 to 3.0% S, 12.1 to 15.0% ash) grade coking coal. Using this classification system, in conjunction with general technologic and geologic considerations for coke oven feedstocks, the Uinta, San Juan River, and Raton Mesa coal regions, Colorado, were selected as areas containing potential coking-coal reserves. Identified original in-place coking-coal reserve estimates then were made utilizing the proposed coking-coal classification system, coal resource evaluation maps, and published coal reserve estimates. In Colorado, the Raton Mesa region contains 2.05 billion short tons, the San Juan River region 1.78 billion short tons, and the Uinta region 0.45 billion short tons of identified coking-coal reserves. The total identified original in-place coking-coal reserves for the State of Colorado are estimated at 4.3 billion short tons.

30187 **(NP—4770296) Procedure in the application of surface seismology.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 14p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770296.

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Surface seismology is a branch of the reflection seismology which forms together with other geophysical processes and the deep drilling technique the basis for the development of reservoir models. The closed-mashed measuring program with multiple overlapping of the data points requires a computer-supported treatment. Physical dependencies limit the exactness of resolution and the correctness of depth data and the size.

30188 **(NP—4901154) Future utilization of Texas lignites: a review. Mineral Resource Cicular No. 63.** van Rensburg, W.C.J. (Texas Univ., Austin (USA)). 1979. 60p. Bureau of Economic Geology, Univ. of Texas, Austin, TX 78712. Order Number TI84901154.

This report evaluates the potential of Texas lignite as a source of energy. Further research into the characterization of lignite, particularly on rank changes and rock strength with depth, and research into the use of Texas lignite as a feedstock for medium-Btu gas production should be undertaken. Factors that are likely to impede such developments, such as limited reserves of shallow lignite and a commitment of a large percentage of the reserves to electricity-generating plants, are briefly considered. It would appear that changes in the energy mix will be costly and that they will be associated with certain adverse impacts on our society. A major challenge for the future of the State will be to obtain a balance between economics and ecology. Although there

will probably be an accelerated trend toward the electrification of the energy economy of the United States, coal and lignite will increasingly have to be used for production of gaseous and liquid fuels, for chemical feedstocks, and for reductants. This will have a dramatic impact on crude-oil refinery practice because the mix of their products will have to change. Solving the energy crisis in Texas and the Nation will require drastic measures. These will include determination of realistic environmental standards and regulations, rapid development of lignite- and coal-fired power stations, and construction of coal gasification and liquefaction plants. Of equal importance is the need to develop viable methods for the recovery of deep-basin lignite resources, which are about 10 times as large as those of near-surface lignites. In addition to in situ gasification, the possible application of conventional and nonconventional underground mining methods should also be investigated.

30189 **(USGS-OFR—81-141) Preliminary hydrologic evaluation of the North Horn Mountain coal-resources area, Utah.** Graham, M.J.; Tooley, J.E.; Price, D. (Geological Survey, Salt Lake City, UT (USA)). 1981. 34p. USGS-OFR, Box 25425-Denver Federal Center, Denver, CO 80255. Order Number TI84901191.

North Horn Mountain is part of a deeply dissected plateau in central Utah which is characterized by deep, narrow, steep-walled canyons with local relief of more than 1000 feet. Geologic units exposed in the North Horn Mountain area range in age from Late Cretaceous to Holocene and contain two mineable seams of Cretaceous coal. The area is in the drainage basin of the San Rafael River, in the Colorado River Basin. Runoff from the mountain is ephemeral. This runoff to the San Rafael River is by way of Cottonwood and Ferron Creeks and represents less than 10 percent of their average annual runoff. The chemical quality of surface water in the area is good. The water is generally of a calcium magnesium bicarbonate type with average dissolved solids less than 500 milligrams per liter. Most of the ground water above the coal on North Horn Mountain probably is in perched aquifers. These aquifers support the flow of small seeps and springs. In some areas, the regional water table appears to extend upward into the coal. Coal mining on North Horn Mountain should have minor effects on the quantity and quality of surface water. The maximum predicted decrease in the annual flow of Ferron and Cottonwood Creeks is less than 4 percent. The sediment loads of affected streams could be significantly increased if construction were to take place during the summer cloudburst season. Subsidence, which usually follows underground coal mining, could create rock fractures through which a perched aquifer might be drained, thus depleting the flow of seeps or springs fed by that aquifer. It is considered unlikely that the mining will adversely affect the chemical quality of the ground water.

30190 **(USGS-OFR—83-33) Hydrology of Area 6, Eastern Coal Province, Maryland, West Virginia, and Pennsylvania.** Staubitz, W.W.; Sobashinski, J.R. (Geological Survey, Reston, VA (USA)). Sep 1983. 111p. US Geological Survey-Open File Service, Box 25425, Denver Federal Center, Denver, CO 80225. Order Number TI84901065.

This report broadly characterizes the hydrology of Area 6, the 1329 square-mile North Branch Potomac River basin. Area 6 comprises parts of Maryland, Pennsylvania, and West Virginia and is almost evenly divided between two physiographic provinces. The allegheny Mountain section of the Appalachian Plateaus physiographic province encompasses the western half of the area and contains coal-bearing rocks of Pennsylvanian age. The area contains two coal-producing regions. Coal production from the area amounted to 3.8 million tons in 1978 and has been steadily increasing in the last several years. Area 6 has a continental, temperate climate and receives between 36 and 45 inches of precipitation depending on elevation. The soils of the area were formed from noncarbonate, sedimentary rocks and are generally of high acidity and low fertility. Forest land occupies over 80% of the land surface, whereas surface mining occupies only about 1.5% of the land surface. The area is drained entirely by the North Branch Potomac River. Water used in the area is mostly from surface-water resources. Ground-water accounts for only 0.5% of total water withdrawals. Seventy-two percent of ground-water withdrawals are used by the coal-mining industry. More than 140 miles of streams in Area 6 are affected by mine drainage. These streams are devoid of fish life and otherwise have severely reduced biological communities. The mean dissolved-solids concentrations and specific conductances were more than three times greater for streams draining coal mining areas than for streams draining unmined areas. The mean pH and net alkalinity of streams draining unmined areas were higher than those of streams draining mined areas. Although concentrations of trace metals in water and bottom sediments were generally low for streams draining both mined and unmined areas, those from unmined areas were noticeably higher.

0120 Mining

REFER ALSO TO CITATION(S) 30219, 30220, 30221, 30222, 31370, 31461

30191 **(BMFT-FB-T—83-312) Electrified driving of stone drifts.** Ludwig, G. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 64p. (In German). NTIS (US Sales Only), PC A04. Order Number DE84751249.

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An electrified equipment was developed for drivages of stone drifts using conventional drilling and blasting techniques. The equipment had to be advanced to a degree of maturity allowing driving rates of approx. 10 m/day. The equipment was to fill the mechanization gap between conventional blasting and fullface roadheading techniques. The machinery consisted of a three-boom jumbo, a wheel loader of 4.6 m^3 shovel capacity, a shifting conveying means, support setting and transport equipment, a reloading station for dry construction materials, including a mixing and pumping installation. The equipment could be advanced to maturity during the trial phase although the driving target was not met. The main reasons for this were unpredictable geological problems during driving operations in the not yet developed northern take of Walsum colliery. An essential conclusion from this has been that driving machinery should be laid out in a way that it operates satisfactorily even in unfavourable geological conditions. According to the present state of knowledge one major prerequisite to obtain this appears to be rock consolidation ahead of drivage and provisory roof-bolting and guniting.

30192 (CONF-8311145—, pp 5-11) **Safety and productivity of mining equipment with diesel engines.** Sallee, J. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

Requirements for certification of diesel engines underground are given: flame paths, flame arresters, electrical components, aluminium components, spark-proof starting systems, engine testing and measurment of exhaust emissions. Based on the emission measurement, the ventilation requirement is calculated - the amount of air required to dilute exhaust gases to a threshold limit value multiplied by 2 (for safety). Additional safety requirements, such as water-cooled manifolds, piping, etc. are discussed. Global experience implies that diesel powered equipment is about 3 times as productive as electrical equipment and that the operation is safer. (LTN)

30193 (CONF-8311145—, pp 23-31) **Epidemiological studies of hazards from diesel emissions.** Ward, A.N. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

In summary, I've attempted to summarize briefly the events that heighten the interest diesel in engine exhaust emissions and the suggestive evidence of adverse health effects and the results of some of the published research. The fact that biological research cannot make a perfect prediction requires ongoing and additional research. The generally low levels of diesel engine exhaust emissions found in the mines considerably below the permissable levels and the NIOSH recommendations, and the lack of any significant evidence of any adverse human health effects leads me to conclude that from a health perspective, the diesel engine can be used safely in the underground mining applications.

30194 (CONF-8311145—, pp 49-64) **Experience with diesel-powered mining equipment in West Virginia.** Bradbury, R. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

The elimination of bare trolley wires, as well as shuttle car cables and cable reels, are major reasons why Martin County Coal chose diesel powered haulage and utility equipment when we opened our two deep mines in 1971. In the intervening years much discussion and debate has ensured concerning the merits, pros and cons, of using diesel equipment in underground coal mines in America. Skeptics have tried for years to find some basis for preventing the introduction of diesel engines underground. Much of this has been centered about a perceived potential health hazards. And, to this date there is no conclusive evidence to support the stand that the United Mine Workers of America have taken that the use of diesel powered equipment is hazardous to coal miners' health. We are well aware that that's the organization where the opposition originates. It is my contention that those of use who use diesel powered equipment are operating potentially much safer mines, simply because we have eliminated hazards that account for a significant number of deaths and injuries in underground coal mines each year. And at Martin County Coal, after 12 years experience using rubber tired diesel powered coal haulers, scoops and personnel carriers, we maintain that we have not introduced equipment that is hazardous to safety or health, but are employing a system of improved safety. We have eliminated the cause of potentially fatal accidents, mine fires and even explosions by using no bare trolley wires, no electric shuttle cars and no battery powered scoops.

30195 (CONF-8311145—, pp 65-69) **Requirements for diesel engine approval and maintenance in Kentucky.** Stanley, W. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

The requirements for permissibility of use of diesel engines in underground mining equipment are considered. An initial permit is for 6 months only and records and inspections are reviewed before it is renewed. Renewal requests are required every 6 months except under special circumstances. Maintenance and inspection is required with records, and has been found to increase the life of diesel engines. (LTN)

30196 (CONF-8311145—, pp 69-75) **United Kingdom experience with underground use of diesel engines.** Sharkey, T. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

There have also been no fires in British coal mines caused by the use of diesel vehicles underground, or diesel engines underground, let me condition that. Fires on locomotives, on diesel locomotives have occurred, but the majority of them were attributed to parts of the vehicle coming into other modes of transport. For example, Ray talked about the brakes - overheated axle boxes, overheated brakes, poor maintenance, oil and grease allowed to accumulate and later it's ignited. Now, the reason for the National Coal Board record with the use of diesel locomotives is, in my opinion, due to the superior training schemes which the Coal Board have, planned preventive maintenance programs which are written into law, and inspections brought by the ministry people, which is the same as your federal or state inspectors, and also by mine and area personnel, and by sampling, which is not necessarily bottled or instrument. In many cases, it is a technique which is being pioneered by Britain, namely to bungling, where the air is continually monitored on the surface. Samples of air are drawn from various parts of the mine and it is continuously sampled.

30197 (CONF-8311145—, pp 79-91) **Methods of reducing exhaust emissions from diesel engines and improving safety.** Wadhams, J.H. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

For diesel engines certification and machine approval covers engine surface temperatures, exhaust emissions, ventilation rates, fuel storage, fuel systems, spark arresting, exhaust cooling and conditioning, the training of operators, the maintenance of the machines after they're on the mine site, shutdown systems, braking systems, scrubber controls, a 2-G electrical systems which are now mandated, an air starting and hydraulic starting. Permissable diesel equipment is so safe it can operate safely in rather high concentrations of methane gas. To be permissable with diesel requires an MSHA safety system certification and a following machine approval. What does that mean? The engines have been selected, tested and certified by MSHA. These diesels are almost always indirect injected which reduces nitric dioxide. Hot surfaces, such as exhaust pipe and manifolds, are fully waterjacketed. The exhaust from the scrubber is mixed with a cooling fan discharge for an easy dilution rate of 10 to 1 before it even leaves the surface of the machine. This air is then blended with an MSHA specified mine air rate passing by the machine. An exhaust scrubber acts as a muffler; it cools the exhaust gas to 107° by law or lower; it removes particulates; takes out better than 50 per cent of the aldehydes; it removes sulphur from the exhaust; and acts as an exhaust spark arrestor.

30198 (CONF-8311145—, pp 92-94) **Electrical systems for diesel engines used underground.** Kersey, F. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

We started work on a safe lighting system, remembering that we could not use a battery in the system whatever, it had to be a self-ignited type of generator/alternator. We worked on this thing for probably several months and the final design was a three-phase ac alternator rectified to 13 volts dc. A certification number for the alternator was issued by the Bureau of Mines in December 1971, under the 2-D Schedule. Our first installation followed shortly thereafter at Martin County Coal on a Wagner ST-5 scoop. The system was composed of a V-belt driven alternator, a certified switch and four scheduled 2-G Part 46 headlights with 35 watt sealed beam bulbs. This system proved to be very reliable and with adequate lighting machine efficiency improved tremendously. Halogen sealed beam bulbs are now available for the same fixtures and increases illumination about 50 per cent. One more component was needed to make the diesel face equipment competitive with battery scoops. This was an easy to read digital methane monitor with the ability to shut down the engine when the methane concentration reached 2 per cent. Our company developed this monitor and shutdown system and sold the manufacturing rights to Appalachian Electronics in 1973.

30199 **(DOE/FE/00016—T31) Technical progress report No. 33 USBM contract JO318097; FMI-BMI-8148, April 1-April 30, 1984.** (Foster-Miller Associates, Inc., Waltham, MA (USA). Engineering Systems Group). 15 May 1984. Contract AI01-81FE00016. 4p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011540.

Field studies of ventilation and dust measurements at several mines have been made. Plans for units to other mines are proposed with details of the measurements to be made. (LTN)

30200 **(EPRI-EA—3526-CCM) Coal Mining Cost Model (MOD-3).** Toth, G.W.; Annett, J.R. (NUS Corp., Gaithersburg, MD (USA)). May 1984. 247p. Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920374.

This report presents an update of the EPRI Coal Mining Cost Models originally published in 1981 as EPRI Report EA-1273, Volumes 1 through 4. Those volumes described a computer program (MOD-2) for estimating production costs of either surface or underground coal mining operations. In the subject report, the original model features and procedures are reviewed in addition to high-lighting the new features incorporated into this most recent version (designated MOD-3). Model changes which are reflected in this version include: (1) expanded surface mining options to allow for mixed equipment; (2) expanded options for longwall mines to vary number of continuous mining sections; (3) expanded capabilities in the financial analysis submodel incorporating new escalation options and revisions to reflect the 1981 tax law changes; (4) updat-

ing the data base of the model to mid-1981; (5) revisions to the software of the model providing for interactive input with batch processing; and (6) providing separate versions of the model which are compatible with IBM mainframes (or plug compatible machines) or Prime minicomputers. This report is designed as a stand-alone document for model application procedures. It also provides an abbreviated review of the original costing methodology (MOD-2) for both the surface and underground analyses. In the course of describing the updates provided in this model version, frequent references are made to sections of EPRI Report EA-1273. The four volumes of that report would therefore serve as a useful companion documents for investigating detailed technical changes to the computation logic.

30201 **(NP—4770285) Changing of a prevolcanized refuse cord belt.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 6p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770285.

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The pithead manshift for the total work to change a cord belt in a refuse belt system is indicated and explained. The belt was placed in the prevolcanized state in a single pass and the used belt was removed. The process and the individual measures for the accomplishment are described.

30202 **(NP—4770286) Planning and use of a computer-controlled roll-loader.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 10p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770286.

Fachgebiet: Abbautechnik; Teilgebiet: Schneidende Gewinnung.

The determination of the location of the loader in the face and of the height of the inclination and cut and the shifting of the loader carrying arms have to be carried out for a partly automatized and computer-controlled shearer loader. Despite to the damages at the individual machinery materials by a too high working rate of the machine a higher average cutterspeed, a secure operation in the machine section and a more uniform course of controlling could be achieved in an underground experimental operation.

30203 **(NP—4770288) Operational experiences with the roller curve.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770288.

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The main advantages of the use of a roller curve in mines with particularly difficult rock conditions are the following: Complete cutting of the floor, displacement of the main drive from the critical transition region face-road, very little lining retardation, secure working by the displacement of the face-road transfer and running-in of a shiftable working stage and finally small open face space at the face entry.

30204 **(NP—4770290) Improvement of hydraulic liquids for the face support.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 8p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770290.

Fachgebiet: Abbautechnik; Teilgebiet: Strebbetrieb.

Hydraulic liquids of the HFA type, emulsions or solutions with high water content, are exclusively used for the face support. Due to the delivery of the HFA liquid as a concentrate the following points should be regarded in the preparation of the liquid by diluting with water: 1. Possibly use drinking water or mine water with drinking water character; 2. Adjust the concentrate share to 1-2 volume-%; 3. Don't use HFA liquids which are aggressive towards materials and 4. Remove microorganisms by the use of concentrates with high boicide content.

30205 **(NP—4770291) Roller operation with shield-type support and pneumatic stowing up to 60 gon dip.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 10p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770291.

Fachgebiet: Abbautechnik; Teilgebiet: Strebbetrieb.

The cutting mining method with a shearer loader with shield-type support and pneumatic stowing was applied in a seam with a strongly inclined bedding and very good results were obtained. The decisive advantages were the decrease of the susceptibility towards geological faults and anomalies of the seam and the decrease of the removals by the increase of the construction lengths on the strike. An operating point is described in detail.

30206 **(NP—4770292) Pneumatic packing with blowing wall.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 7p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770292.

Fachgebiet: Abbautechnik; Teilgebiet: Strebbetrieb.

In a mine with a very friable and heavy counterrock a stowing method for the better control of the hanging side wall and the outgassing has been developed. The pneumatic stowing material is discharged on buttock and therefore introduced with high density. The process and the course of the work of the mining and the pneumatic packing are described.

30207 **(NP—4770293) Assignment of the plough and conveyor velocity.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 8p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770293.

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The correlations of the plough and conveyor velocity with the surface cutting, cutting depth, filling and charging cross sections are given. The four plough methods (conventional, combination, constant overhauling and overhauling combination) are presented and the corresponding assignments of the plough and conveyor velocity are indicated.

30208 **(NP—4770294) Keeping the gateroad on and behind the coal face in connection with cutting winning.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 7p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770294.

Fachgebiet: Vortriebstechnik; Teilgebiet: Abbaustreckenvortrieb.

The essential reasons for the present preference of working with the face and behind the face are the higher stability of the driven roads and the possibility to use development rocks as border stowing. The report presents results of the cutting of the stable-hole and road along with the face with shearer loaders. Further developments in the cutting face end technique are the use of the all-bit spraying, the variation of the number of rotations of the roll, and an automatic control for an exact profiling of the road carried with the face.

30209 **(NP—4770297) Improvement of the blasting by large-calibre cartridges.** (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770297.

Fachgebiet: Vertriebstechnik; Teilgebiet: Teufen.

By the use of a shaft drilling machine to drill large boreholes of 50 mm diameter and by the use of cartridges with large diameter the number of boreholes in the sinking process could be decreased. By this means a shortening of the time spent for the drilling and blasting works could be achieved. The rule of thumb that a decrease of the number of boreholes of 3% per mm of enlargening of the cartridge diameter is to be expected was proven valid.

30210 **(PB—84-141589) Coal-cutting forces and primary dust generation using radial gage cutters. Report of investigations/1983.** Roepke, W.W.; Voltz, J.I. (Bureau of Mines, Twin Cities, MN (USA). Twin Cities Research Center). Nov 1983. 30p. NTIS, PC A03/MF A01.

Library of Congress catalog card No. 83-600225.

The Bureau of Mines determined coal-cutting forces and primary dust generation of four styles of radial gage bits as used on end rings of continuous mining machines. Direct comparisons for reference were made with two widely used conical plumb-bob types having 60 degrees and 90 degrees (nominal) included tip angles. The cutting forces for all of the gage bits were similar to those of the 60 degrees -tip plumb-bob bit. All bits except the RAD-3 gage bit generated similar amounts of primary total dust at shallow cutting, but during deeper cutting, the amounts varied and the gage bits produced as much as 2-1/2 times the dust produced by the 60 degree bit.

30211 **(PB—84-143460) Slack and overload rope protection system. Open file report, 28 Mar 79-15 Jan 83.** Farley, H.L.; Fish, R.B.; Jeffcoat, R.L.; Hoadley, D.L. (Foster-Miller, Inc., Waltham, MA (USA)). Jan 1983. 328p. NTIS, PC A15/MF A01.

This report describes the development of an electronic system that detects unsafe slack and overload conditions in underground mine hoist ropes. The slack and overload rope protection system (SORPS) includes a fail-safe load cell inserted between the rope and the conveyance, and an accelerometer mounted on the conveyance. Signals from these transducers are telemetered via a radio link to the hoist control room, where they are combined with drum speed and chair status in a microprocessor-based decision and display unit. Abnormally high external force levels are detected as discrepancies between rope tension and cage acceleration; conveyance weight is inferred continuously. Hazardous conditions are displayed to the hoist operator, along with general hoist status.

30212 **(USGS-OFR—82-334) Procedures for assessment of cumulative impacts of surface mining on the hydrologic balance.** Lumb, A.M. (Geological Survey, Reston, VA (USA)). 1982. 56p. US Geological Survey, Open File Service, Box 25425 Denver Federal Center, Denver, CO 80225. Order Number TI84901190.

The Surface Mining Control and Reclamation Act of 1977 requires the designated regulatory authority of each state to assess the probable cumulative impacts of all anticipated mining upon the hydrology of the area. The Act also states that quantity and quality of water is to be considered as well as seasonal variations in flow. Techniques were developed to assess the probable cumulative impacts including concepts of a hydrologic activity profile, an impact matrix, and an impact profile. An activity profile of cumulative drainage area versus river miles downstream from the surface-mining site is constructed that shows major water uses, flood-prone areas, and stream classifications. From the summary shown by the activity profile, an impact matrix is used as a checklist for the probable importance of the impacts under categories such as water supply, flood-prone areas, and water-contact recreation. These impacts are quantified either by a simple model or a more comprehensive and accurate one and are displayed on an impact profile showing the percentage change in a hydrologic characteristic versus distance downstream of the surface-mining site. The simple model for quantification considers only dilution from tributary areas during critical periods, whereas the comprehensive model routes flows and quality of water continuously through the year and considers, in addition to dilution, instream processes such as settling, biological uptake, and chemical reactions. 44 references, 12 figures, 10 tables.

0130 Transport And Handling

REFER ALSO TO CITATION(S) 30120, 30142

30213 **(DOE/PC/40285—10) Program of basic research on the utilization of coal-water mixture fuels.** Parfitt, G.D.; Casassa, E.Z.; Toor, E.W.; Rao, S.A.; Sommer, H.T.; Mitra, A.; Padmanabhan, J.; Matsuzaki, Y.; Marnicio, R.; Pleskow, M. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Center for Energy and Environmental Studies). Mar 1984. Contract FG22-81PC40285. 331p. NTIS, PC A15/MF A01; 1; GPO Dep. Order Number DE84008603.

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This report summarizes a two-year program of basic research on the utilization of coal-water mixture fuels as a substitute for petroleum in utility and industrial boiler application. This research addressed two major problem areas in which fundamental understanding is needed: (1) stability of coal-water mixtures, and (2) atomization of coal-water mixture fuels. Stability Studies - A study of the relation of surface chemistry to coal/water slurry properties has resulted in a model for slurry behavior relating rheology and sedimentation stability to particle surface charge. The model was derived from measurement of electrophoretic mobility, rheology and sedimentation rates and settled volumes for aqueous slurries of four coals. The same type of slurry characterization has been done for slurries of the four coals in solutions of four simple well-characterized surface active additives. Atomization Studies - During the two-year program a numerical model of the three phase sprays was developed. This model considered the presence of slurry droplets, pure water droplets, and solid dry coal particles. Parallel to the modeling experiments, slurry sprays were conducted to determine the physical effects responsible for the breakup of the slurry jet in small droplets. The atomization quality was assumed to be characterized by the size distribution of slurry droplets observed in the spray at different locations. The results of this investigation lead to the design of effective CWS burner nozzles meeting the requirements of easy ignition and combustion of CWS. The knowledge generated during this program contributes to the improvement of burning CWS and allows the shaping of CWS flames for retrofit applications in industrial and utility combustion installations. 103 references, 135 figures, 35 tables.

30214 **(DOE/PC/60806—T1) Preparation of super-clean coal. Technical progress report for first and second quarters, September 15, 1983-March 14, 1984.** Yoon, R.H.; Adel, G.T. (Virginia Polytechnic Inst. and State Univ., Blacksburg (USA). Dept. of Mining and Minerals Engineering). May 1984. Contract FG22-83PC60806. 37p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012286.

This report is concerned with the progress made during the first six months of the three-year project (DE-FG22-83PC60806). A significant portion of this reporting period has been consumed in building experimental apparatus and equipment. The batch attrition grinding experiments conducted on the Elkhorn Seam coal exhibit the first order breakage phenomenon. The grinding rate is found to depend critically on feed size and grinding media size under a given agitation speed. Bubble loading by coal particles has been found to increase with increasing bubble residence time in a flotation cell, suggesting that the bubble loading should increase with decreasing bubble size. Also, the collection efficiency of bubbles is found to increase with decreasing bubble size. These two observations may account for the improved flotation kinetics and, hence, the recovery with decreasing bubble size. Zeta-potentials of air bubbles have been measured using a modified Rank Brothers electrophoresis apparatus. The bubbles stabilized by sodium dodecyl sulfate exhibit negative zeta-potentials, while those stabilized by dodecyl ammonium hydrochloride exhibit positive zeta-potentials below pH 9.5. The bubbles stabilized by a polypropylene glycol show an isoelectric point (i.e.p.) at pH 3.6 regardless of the frother concentrations employed. The i.e.p. of bubbles stabilized by methyl isobutyl carbinol is found to be approximately pH 5.4. Batch flotation experiments conducted on a low ash Elkhorn Seam coal (2% ash) show that the ash content can be reduced to 1.2% with 70% recovery and to 0.8% with 33% recovery. The low recovery is attributed to

the fact that froth stability decreases significantly with decreasing particle size. The tests conducted using a stronger frother on a high ash Eagle Seam coal (28% ash) show encouraging results; after two stages of flotation, the ash content is reduced to below 3% with close to 90% recovery. 6 references, 17 figures, 3 tables.

0140 Combustion

REFER ALSO TO CITATION(S) 30120, 30121, 30155, 30160, 30161, 30172, 31122, 31214, 31383, 31454, 31455

30215 **(DOE/FE/60181—94) Combustion research and ash fouling for low-rank coals.** Jones, M.L. (North Dakota Univ., Grand Forks (USA). Energy Research Center). Jun 1984. Contract FC21-83FE60181. 14p. (CONF-8406121—4). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012875.

From Contractors' conference - DOE advanced research and technology development program; Pittsburgh, PA, USA (5 Jun 1984).

It has been shown that under fine coal grinding, liberation of mineral phases will occur. One of the phases readily separated is SiO_2 or quartz. If this has occurred in the case of micronized coal, although the coal mineral phases are present, the intimate contact at high temperatures will not occur as often. This may explain the decreased amount of melilite noted in the outer sintered layer of deposits formed during combustion of micronized coal. Earlier work has proposed that phases in the melilite group are the glue that binds the deposits together and contributes to the deposit strength. The decreased strength noted in deposits from micronized coal combustion is also consistent with the decreased amount of melilite which would act as a binding agent joining the discrete mineral particles in the deposit. Micronized coal appears to produce deposits which are both smaller and have less strength than those noted in the combustion of larger particle size coal. Smaller ash particles, produced from the micronized coal, would contribute to decreased deposit size. The fluid dynamics would tend to cause smaller particles to follow the stream lines instead of impacting the tube surface. In addition, the finer grind appears to have altered the mineral phases impacting the tube surface, thus decreasing the stickiness or strength noted in deposits from a high sodium lignite coal. 8 references, 5 figures, 5 tables.

30216 **(DOE/MC/16014—1573) Modeling of pressurized fluidized bed combustion of coal. Volume I. PFBC system model development. Final report.** Louis, J.F.; Tung, S.E. (Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.). Jul 1982. Contract AC21-81MC16014. 180p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84009289.

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Fluid bed reactors were first used as catalytic reactors in the petroleum industry. This application, in order to maximize gas-solid contact, requires small particles and low gas velocities. Most empirical correlations for elutriation, gas exchange, etc. are based on data obtained with small particles. The atmospheric fluid bed coal combustor represents a significant break with this tradition. In order to maximize heat release per plane area AFBC's use large particles and high gas velocities. An absence of data on large particle systems represented a major obstacle in the development of a model to predict performance of AFBC's. However, once the need was established experimental programs were undertaken to obtain the necessary data and our present understanding of bed operation under these conditions far exceeds our knowledge 5 or 6 years ago. Unfortunately, basic information regarding flow regime, solids carry over, gas mixing, attrition, order of reaction etc. are not available. Until such information becomes available one cannot expect any PFBC model to yield accurate predictions concerning such important parameters as bed expansion, combustion efficiency, sulfur retention, etc. The approach taken in formulating the PFBC model is to incorporate basic physical principals as well as empirical relations as they are presently available to generate a mathematical framework.

30217 **(DOE/PC/30295—8) Kinetics of NO/sub x/ formation during early stages of pulverized coal combustion. Final report September 1980-September 1982.** Kennedy, J.M.; Pessagno, S.L.; Garman, A.R.; Krill, W.V. (Acurex Corp., Mountain View, CA (USA). Energy and Environmental Div.). Dec 1982. Contract AC22-80PC30295. 116p. NTIS, PC A06. Order Number DE84002176.

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A well-stirred reactor was used to study the early stages of pulverized coal combustion. In particular, data were gathered on nitrogen species evolution and NO/sub x/ formation rates under environments characteristic of the near-burner region of high-swirl, pulverized coal burners. Using natural gas to provide a hot gas environment, experiments were performed with both fuel-rich and fuel-lean pulverized coal mixtures, over a range of temperatures and particle residence times, and with a variety of coal types. The experimental tests were designed to examine coal devolatilization and NO formation kinetics during the first 20 ms of combustion. An analysis of the data resulted in the correlation of devolatilization and fuel nitrogen evolution rates to residence time and temperature. Correlation of NO conversion data was also achieved as a function of reactor equivalence ratio.

0150 Marketing And Economics

REFER ALSO TO CITATION(S) 31027

30218 **(IEA/EAS—G4) Organisation and structure of the Pacific steam coal trade.** Gaskin, M. (Aberdeen Univ. (UK)). Oct 1983. 87p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84901050.

This report examines the modern steam coal trade between the Pacific Rim countries; it focuses on institutional structure, the organization and commerical practices of the trade - including contract arrangements - and the functioning of the regional market. Questions of risk and risk handling are discussed, also the nature and degree of competition, including the significance of bilateralism, the formation of price, information flows and the effects of government intervention on market operation. The report concludes with a review of problems and prospects in the Pacific trade and with recommendations for improved market function.

0160 Health And Safety

REFER ALSO TO CITATION(S) 30150, 30180, 30181, 30192, 30193, 30194, 30210, 31370, 31460, 31655

30219 **(CONF-8311145—) Diesel equipment in underground coal mines.** (Virginia Coal Council, Richlands (USA)). 29 Nov 1983. 109p. NTIS, PC A06/MF A01. Order Number DE84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

A meeting was held on Diesel Equipment in Underground Coal Mines at the Southwest Virginia Community College, Richlands, Virginia, on November 29, 1983. The meeting was sponsored by the Virginia Coal Council. Eight papers given have been entered individually into EDB and ERA. (LTN)

30220 (CONF-8311145—, pp 11-23) **Health hazards from underground use of diesel engines.** Weeks, J.L. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

The Deputy Director of Occupational Health of the UMW gives the materials in diesel exhaust: CO, CO_2, NO, NO_2, SO_2, aldehydes, formaldehyde, soot and PAH. The NO_2, even at low levels, can contribute to the risk of chronic bronchitis, emphysema and other forms of chronic lung disease. Some of the PAH are known carcinogens and occur in both the gaseous phase and adsorbed on the soot particles. In summary the longterm risks of disease are something like chronic bronchitis and emphysema, an increased risk of pneumoconiosis from the soot and a fairly big ques-

tion about the possible increased risk of cancer, primarily lung cancer, although it may occur in other places as well. Now, what we're looking at is the combined effects of all of these ingredients, plus coal mine dust, in contributing to the health hazards of underground mining. The diesel engines may have low exhaust emissions when new but what happens when they age and when preventive maintenance is not carried out. Extracts of diesel exhaust are positive in bacterial tests; results are negative in inhalation tests on animals (as is cigarette smoke); and positive in epidemiology for cigarette smokers, coke oven workers, roofers, etc. So far epidermiology of mine workers is inconclusive, but the author feels further work should not be done by experiments on coal miners. (LTN)

30221 (CONF-8311145—, pp 31-37) **Health hazards from diesel exhausts.** Reger, R. 29 Nov 1983. NTIS, PC A06/MF A01. Order Number TI84900864.

From Diesel equipment in underground coal mines meeting; Richlands, VA, USA (29 Nov 1983).

Research by Appalachia Laboratories on the effects of diesel engine exhausts in coal mines, salt mines, metal mines and trona mines are reviewed. No significant effects on miners were found although a considerable amount of work was involved (in some cases involving control studies at nearby mines using electrical equipment). The author admits that diesel exhaust gases are harmful but, in practice, the exposures are low enough that deleterious effects to human health cannot be demonstrated. (LTN)

30222 (NP—4770287) **Early detection and protection measures.** (Ruhrkohle Oel und Gas G.m.b.H., Bottrop (Germany, F.R.)). 1982. 10p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770287.

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The conditions for the gas eruption danger in deporids are discussed with respect to early detection. In case of a suspicion of gas eruption a determination of the gas content and ptospect dri\lings are carried out in the seam regions which are prone to outbursts. Additional measures for the protection of the workers are listed.

30223 (PB—84-148378) **Health hazard evaluation determination report No. MHETA-81-108-9006, Consolidation Coal Company, central machine shop 20, Cadiz, Ohio.** Cornwell, R.J.; Hodgson, M. (National Inst. for Occupational Safety and Health, Morgantown, WV (USA)). 1984. 21p. NTIS, PC A02/MF A01.

Employee exposure to welding fumes and solvents at the Consolidation Coal Company Central Machine Shop 20 (SIC-1211), Cadiz, Ohio, was investigated. The Mine Safety and Health Administration (MSHA) requested the study following worker reports of alleged excessive morbidity and mortality. The study was performed on February 22 to 24, 1982. About 75 individuals were employed at the shop. Personal and area air samples were collected. Airborne concentrations of manganese (7439965), iron (7439896), fluorides, ozone (10028156), nitrogen-dioxide (10102440), and carbon-monoxide, (630080) were below applicable NIOSH recommended limits. Twenty percent of the samples for chromium (VI) (18540299) exceeded or equaled the NIOSH standard of 0.001 milligrams per cubic meter (mg/m3), having values of 0.002 and 0.001mg/m3. Three of eight nickel (7440020) samples obtained for welders in the blacksmith shop showed time weighted averages of airborne nickel in excess of the NIOSH standard of 0.015mg/m3. The authors conclude that welders in the blacksmith shop are exposed to chromium (VI) and nickel, both of which are carcinogenic. Recommendations include improved ventilation systems, use of metal fume respirators and tinted spectacles, and worker education.

0170 Legislation And Regulations

30224 **Solid Waste Disposal Act Amendments of 1980: the institutional and regulatory impact on the electric utility industry.** Beck, R.A.; Trench, W.C. (Edison Electric Inst., Washington, DC). pp 477-482 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Amendments to the Act are examined. It is revealed that the fate of the disposal and reuse of these wastes will rely on the corresponding actions taken by EPA, the Congress, and possibly the utility industry itself. The amendments defer the regulation of wastes and give EPA 24 months to complete a study of these wastes and report its findings to Congress. Congress then has 6 months to act on the findings. A letter from the EPA Office of Solid Waste (Dietrich letter) provided an important description of the wastes temporarily exempt from the hazardous waste regulations. (DMC)

02 PETROLEUM

REFER ALSO TO CITATION(S) 30120, 30121

0201 Reserves

30225 **(GAO/RCED—84-92) Status of Strategic Petroleum Reserve activities as of December 31, 1983.** (General Accounting Office, Washington, DC (USA). Resources, Community and Economic Development Div.). 13 Jan 1984. 26p. US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760. Order Number TI84901123.

This report covers the SPR activities which occurred during the fiscal year quarter ending December 31, 1983. It discusses (1) DOE's Oak Ridge Operations Office activities, including its report on the status of the SPR; (2) the activities associated with adding 18.1 million barrels of oil to the SPR during the quarter; (3) the major activities at the SPR storage sites; and (4) the status of the SPR oil acquisition and transportation account. In addition, this report also provides information on other SPR issues. It discusses a recent DOE contractor report that identified potential corrosion problems in the Bayou Choctaw/St. James pipeline; Seaway Pipeline Inc.'s efforts to sell the Seaway Terminal which services the Bryan Mount site; and the Defense Fuel Supply Center (SFSC) - purchasing agent for most of the SPR oil - efforts to collect overpayments for oil received at the St. James Terminal.

0202 Geology And Exploration

30226 **(IFP—31-316) Study of the superficial sea sediments by the measurements of the reflexion coefficient.** Sousounis, G. (Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison; Paris-6 Univ., 75 (France)). Jul 1983. 167p. (In French). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84751541.

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Fast and inexpensive methods of sediment examination are required for petroleum offshore operations (platforms, pipe lines, drilling). Five methods of calculating the reflexion coefficient are tested. These consist of comparison of the energies of the direct and reflected wave yields results with the minimum dispersion. A reflexion coefficient-like sediments diagram, established by using results of others studies, is tested by measurement of the reflexion coefficient in the Gironde river and in the Mediterranean sea (Golfe Juan). The results show that: a) this diagram may be used for the identification of sea-sediments; b) the concavities, convexities and discontinuities of the sea bed are the reasons of measurement dispersion. This influence may be corrected by using simple models of the sea floor.

0203 Drilling And Production

REFER ALSO TO CITATION(S) 30246, 31026

30227 **(DOE/BC/10083—19) Basic studies in the displacement of residual oil by chemical flooding. Final report.** Flumerfelt, R.W.; Payatakes, A.C. (Houston Univ., TX (USA)). Jul 1984. Contract AC19-79BC10083. 65p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012937.

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Enhanced oil recovery research at the University of Houston has focused on certain aspects which are basic to the microscopic and macroscopic displacement processes occurring in low tension surfactant flooding processes. These have included: (1) Identification of the magnitude and role of dynamic interfacial effects in displacement and reconnection of low tension systems. (2) Identification of the coalescence characteristics of low tension systems and the effects on oil bank formation and oil recovery efficiency. (3) Evolution of pore level models of displacement, reconnection, and breakup phenomena in porous media. (4) Description of the displacement dynamics and interactions of oil blob populations moving through porous media. In connection with these objectives the important observations are discussed in this report. In general, this work should contribute to a more basic understanding of the dynamics of low tension immiscible displacement in porous media. 32 references, 24 figures, 2 tables.

30228 **(DOE/CE/15149—T1) Shock mounted Stratapax oil well drilling bits. Final technical report.** (Evans (Robert F.), Dallas, TX (USA)). 9 Jun 1984. Contract FG01-82CE15149. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011726.

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Preliminary to beginning design and drafting work, an exhausting study of the literature having to do with the subjects of Stratapax bit design, construction, and application was made. These bits being relatively new in the drilling industry are in an early state of development and there is much research work being done and many results are being published. New patents issue frequently. Advertisements of the many producers are also a source of information. All of these sources were included in the study. Two principles of bit design were adopted from the study: (1) Stratapax cutting surfaces would be positioned to provide a negative rake angle in two directions; (2) each Stratapax cutter would be located so that it was required to cut the same volume of formation as every other cutter. Of course there was no precedent for the shock mounting design principle. Spring design technology was used to guide the design of the spring elements. In this preliminary study two attractive field testing areas were discovered. Since the total funds made available were limited and discussions with drilling laboratory personnel had shown that laboratory testing would leave no funds for field testing, the decision was made to forego the laboratory tests and pursue two field test situations. The first is a bit for drilling oil shale in an underground mine in Western Colorado. They drill 4 1/4 inch diameter holes about 24 feet horizontally into the face. Minimum cost per foot is the goal. The second field test opportunity is in the oil fields of central Oklahoma where drilling is expensive because of dipping, varying hardness beds which cause bits to deviate from vertical in their course. These holes are mostly 7 7/8 inch in diameter and frequently exceed 10,000 feet in depth. 6 figures.

30229 (NP—4751453, pp 35-54) **Summary of exploration development and production activities on the Norwegian continental shelf in the next few years.** Sitje, O. 1982. (In Norwegian). NTIS (US Sales Only), PC A12/MF A01. Order Number TI84751453.

In Norwegian-Danish offshore 82. Report.

Exploration, development and production plans on the Norwegian continental shelf are presented for actual and planned fields. Gas distribution systemes oil transport, and operation costs are forecast over 1990 horizon.

30230 (NP—4751453, pp 71-86) **Global offshore market and possibilites of the Danish and Norwegian industry on this market.** Ullring, S. 1982. (In Norwegian). NTIS (US Sales Only), PC A12/MF A01. Order Number TI84751453.

In Norwegian-Danish offshore 82. Report.

Danish and Norwegian offshore operations are placed on greater sea-depths and in worse atmospheric situation than most other and are, in spite of very little contribution to world oil supplies, of great interest to other countries. Danish and Norwegian engineering, maintenance and catering industries should gain foreign markets in specialized service which would affect favorably Nordic economy and employment.

30231 **(NP—4770303) Economic-geological aspects of private investments in petroleum and gas drilling projects in the USA.** Meurer, H.W. (Koeln Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 15 May 1982. 180p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE84770303.

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The topics mainly emphasized are the discussion of the American licensing procedures, the assessment of various drilling strategies, the applicability of estimations on reserves as criteria of assessment, and the presentation of the American onshore drilling activities. The topics were chosen with regard to the investment possibilities of private investors which will mainly be concentrated on the purchasing of drilling licenses, the execution of drilling projects, and the purchasing of reserves already determined.

30232 **(NP—4770316) Investigation on the suitability of polymer solutions for increasing the degree of petroleum displacement.** Dietzel, H.J. (Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen). 28 May 1982. 168p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84770316.

Model studies are used to investigate the parameters which lead to an enhancement in yields of oil from underground deposits following waterfloading by a tertiary flooding process using polymer solutions. Sand and sandstone serve as models for the reservoir and hydroxyethylcellulose, biopolysaccharide and polyacrylamide in different concentrations as the polymers. The following parameters have been studied: oil viscosity, flood distance, flooding velocity, slug size of the polymer solution, injectability and resistance factor. In addition to these studies after fields and parameters related to polymer solutions are discussed.

0204 Processing

30233 **(IFP—31-152) Study of the influence of porous texture of CoO-MoO_3/Al_2O_3 catalysts on hydrotreating of Boscan crude oil.** Plumail, J.C. (Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison). Jun 1983. 154p. (In French). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84751540.

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Different catalysts of composition CoO(3%), MoO_3(14%), Al_2O_3(83%) are prepared on supports with variable porous texture (specific surface from 15 to 25 m^2/g). Physicochemical properties and reactivity of the catalysts are tested. Activity of catalysts is measured for conversion of asphaltenes, hydrodesulfurization and demetallization of Boscan crude oil in a recycled fixed bed at 380°C and 12 Mpa with a contact time varied from 0 to 3 hours. With homogenous pore size distribution, maximal activity is obtained for a mean pore diameter of 10 nm for hydrodesulfurization and of 15-20 nm for asphaltene conversion and demetallization. With heterogeneous pore size activity is constant for hydrodesulfurization and increase of 40% for asphaltene conversion and demetallization. For asphaltene conversion during hydrotreatment desulfurization, denitrogenation and hydrogenation of catalysts are necessary.

30234 **(LBL—17769) Supercritical-fluid extraction calculations for high-boiling petroleum fractions using propane. Application of continuous thermodynamics.** Cotterman, R.L.; Dimitrelis, D.; Prausnitz, J.M. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 29p. (CONF-8404164—1). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012261.

From Meeting of the Deutsche Bunsen-Gesellschaft fuer Physikalische Chemie; Koenigstein, F.R. Germany (4 Apr 1984).

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Supercritical-fluid extraction is a useful process for upgrading heavy multicomponent mixtures such as high-boiling petroleum fractions. Design-oriented calculations are reported for an extraction process using propane to extract intermediate components from a petroleum fraction with molecular weights in the range 150 to 500. The composition of the heavy-hydrocarbon mixture is de-

scribed by two continuous distribution functions of molecular weight, one for paraffinic and one for aromatic components. Process calculations are based on a recently developed thermodynamic framework for mixtures with very many components, coupled with an equation of state of the van der Waals form. Particular attention is given to multicomponent phase equilibria in the retrograde region where solvent recovery is favorable. Quantitative results are given for solvent capacity and selectivity as a function of operating conditions.

0205 Products And By-products

30235 **(NP—4770307) Kinetic measurements on the system olefin/hydrogen/precious metal catalyst in the pressure and temperature range of technical petroleum conversion processes.** Rupp, M. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen). 14 Jul 1982. 174p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84770307.

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The starting point of this research work was the question to what extent the hydrogenation activity of technical bifunctional catalysts can be characterised by the model reaction of the hydrogenation of smaller olefins. Of interest was the behaviour of the reaction system under conditions of pressure and temperature approximately those occurring in technical petroleum conversion processes, eg. catalytic hydrocracking. In order to clarify this question the kinetics of conversion of 1-butene/hydrogen and propene/hydrogen mixtures on platinum and palladium catalysts with different carrier and metal content was investigated. The reactions were carried out in an open recycling reactor at temperatures up to 325°C and overall pressures up to 70 bar.

30236 **(NP—4770319) Hydroconversion of organic nitrogen compounds on refining catalysts.** Koehler, W. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen). 9 Jul 1982. 149p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84770319.

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Many organic nitrogen and sulphur compounds are present in heavy oil fractions. By catalytic pressure hydrogenation these heteroatoms can be split off in the form of ammonia and sulphur without break-down of the hydrocarbon skeleton. Molybdenum and wolfram serve as main catalyst components and nickel and cobalt as promoters. Since nitrogenous compounds can only be removed with difficulty by hydrogenation, the kinetics of model nitrogenous compounds during catalytic hydrogenation are studied here. Substances used are aniline, pyridine, pentylamine, dipentylamine, piperidine and dibutylamine both as mixtures and single compounds. The catalysts are in the sulphidic form as a fixed bed. The parameters temperature and retention time are varied, the former from 150 to 450°C, the latter from 5 to 30s, the pressure remaining constant.

0206 Health And Safety

30237 **(PB—84-145804) Control technology assessment of petroleum refinery operations: indepth site visit report, Sigmor Three Rivers Refinery.** (Radian Corp., Salt Lake City, UT (USA)). Oct 1982. 64p. NTIS, PC A04/MF A01.

See also PB84-146885.

Examples of good employee exposure control techniques associated with petroleum refining operations were identified. A visit was made to Sigmor's Three Rivers Refinery (SIC-2911) located at Three Rivers, Texas. The exposure controls studied were the hydrogen-fluoride (HF) alkylation unit change room, the HF alkylation unit separate maintenance facilities, and the HF alkylation unit emergency shower booths. Its design included separate facilities to prevent accidental HF exposure to maintenance personnel at the central shops due to inadvertent handling of contaminated equipment from the HF unit. The shower facilities included three showers to decontaminate anyone who had been sprayed with HF acid. When the showers were entered, an alarm automatically notified a central control room of their use. At least a 30 minute supply of tempered water became available for HF acid wash down.

30238 **(PB—84-149178) Health hazard evaluation report No. HETA 80-206-1164, Mid-South Terminals, Memphis, Tennessee.** Gorman, R.; Liss, G. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Aug 1982. 45p. NTIS, PC A03/MF A01.

Total pitch dust exposures ranged from 0.04 to 6.80 mg/cu m (mean = 1.15) for 10 personal breathing-zone samples. The following eight PNAs were quantified in air samples: benozo(k)fluoranthrene, benzo(b)fluoranthrene, pyrene, benzo(a)anthracene, chrysene, benzo(e)pyrene, benzo(a)pyrene, and fluoranthrene. Protective equipment was considered adequate. Deficiencies were noted in work practices. Skin lesions, possibly pitch-induced were observed in 4 workers. There was some indication that the sun screen lotion recommended after the first visit was beneficial. Handling the pitch at night and the use of personal protective equipment has decreased the associated health risks, but acute health effects are still occuring especially when available protective equipment is not utilized.

0207 Marketing And Economics

REFER ALSO TO CITATION(S) 30230

30239 (CONF-8008175—, pp 35) **Reflections on the 1973 oil crisis - economic aspects.** Schaller, F. 1982. (In German and French.). NTIS (US Sales Only), PC AXX/MF A01. Order Number TI84770281.

From VSE general meeting; Geneva, Switzerland (22 Aug 1980).

The characteristics of the crisis-like development are pointed out by showing differences compared to former crises. The attempt is made to give an explanation of its origin. Within the framework of the new international economic order, the author goes into detail as far as the part is concerned which is played by the third world. The new OPEC strategy is explained. The repercussions of OPEC's strategy are considered to be even more accentuated price rising rounds or unilaterally decreased cuts in oil supplies. In the short run, there is no antidote against this. In the long run, only alternative energy sources can be the remedies expected.

30240 **(DOE/EIA—0202(84/2Q)-1) Short-term energy outlook. Quarterly projections, May 1984.** (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). Jun 1984. 56p. NTIS, PC A04/MF A01; 1 - GPO; GPO Dep. Order Number DE84012804.

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Domestic petroleum demand in 1984 is expected to show an increase, on an annual basis, for the first time since 1978. Due to the projected continuation of the current economic recovery, domestic petroleum consumption in 1984 is expected to average 15.6 million barrels per day, 3.0% higher than the 1983 demand. This is still 2.7% below the 1981 level. US petroleum demand in the first half of 1985 is projected to average 15.5 million barrels per day, slightly below the year-earlier level. This downward revision primarily reflects higher automobile efficiency and conservation of residual fuel oil in the industrial and utility sectors. Data for the first quarter show a slightly higher rate of economic recovery than forecast. World oil prices are expected to remain stable at $29 per barrel. US energy needs will be met by a higher level of oil imports in the short term; as domestic crude oil production is forecast to remain constant between 1983 and 1984. This forecast for oil imports assumes that OPEC will maintain the $29 per barrel marker crude price and increase production quotas as needed to meet demand. Increased oil consumption in the market economies is expected to be met by current production with no appreciable rise in the world oil price during 1984. The economic growth in the industrial nations is expected to continue throughout 1984. Demand for petroleum is projected to increase by about 2.4% and market economies by the first half of 1985. Domestic coal consumption is projected to increase by 8%, compared with a 4% increase last year. This forecast is contingent upon growth in electricity generation of nearly 5%.

30241 (DOE/EIA—0340(83)/1-Vol.1) Petroleum supply annual 1983. Volume 1. (USDOE Energy Information Administration, Washington, DC). Jun 1984. 148p. NTIS, PC A07/MF A01 - GPO; GPO Dep. Order Number DE84012755.

The Petroleum Supply Annual (PSA) contains information on the supply and disposition of crude oil and petroleum products. The publication reflects data that were collected from the petroleum industry during 1983 through annual and monthly surveys. The PSA is divided into two volumes. This first volume contains the following 3 sections: petroleum supply summary; refinery capacity; and deliveries of fuel oil and kerosene. Each section contains the final annual data. The second volume contains final statistics for each month of 1983, and replaces data previously published in the Petroleum Supply Monthly (PSM). The tables in Volumes I and II are similarly numbered to facilitate comparison between them.

30242 (DOE/EIA—0376(81)) State energy price and expenditure report, 1970-1981. (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). Jun 1984. 200p. NTIS, PC A09/MF A01 - GPO; GPO Dep. Order Number DE84012977.

Estimated average energy prices and annual energy expenditures in the US and in each State and the District of Columbia for 1970 to 1981 are presented by type of energy and by economic sector. Data provides expenditure estimates for each energy source consumed, a subtotal of expenditures for primary consumption, which measures all energy expenditures excluding electricity, and total energy expenditures; summarizes expenditure estimates for energy sources within each of the five economic sectors; and displays energy price estimates in a similar format. All expenditures are consumer expenditures, that is they represent the money directly spent by consumers to purchase energy. The documentation includes sources of data, methods of estimation, notes on conversion factors, and a section describing methodology. An appendix lists the cases of regional price imputation. Energy expenditures are assigned to one of the five economic sectors according to the following general guidelines: Residential Sector; Commercial Sector; Industrial Sector; Transportation Sector; and Electric Utilities Sector.

30243 (DOE/RA/31029—T1) Oil inventory capacity in selected countries and estimates of global inventory fluctuations: 1978 to 1982. Krapels, E.N. (Energy Security Analysis, Washington, DC (USA)). Jul 1983. Contract AI01-81RA31029. 210p. Energy Security Analysis, Washington, DC. Order Number TI84010419.

The principal objective of this project has been to determine the feasibility of constructing a data base on world primary secondary, and tertiary oil storage capacity. This objective was inspired by the view that surges in stock levels - i.e. sudden changes in the amount of oil storage owners desire to hold - can have a substantial impact on supply, demand, and prices in the world oil market. Those interested in improving their understanding of the market would benefit from a better picture of the storage situation. This report presents the fruits of research into the storage scene in seven industrial countries: the United States, Japan, West Germany, France, Italy, Spain, and the Netherlands. One finding of this project is that it is indeed possible to construct a useful data base. A major obstacle, however, is the poor quality of information on secondary and tertiary capacity in some countries. The cooperation of government and industry is essential to overcome this handicap. Our research was greatly aided by such cooperation.

30244 (GAO/IMTEC—83-5) Software problems in the development of the Defense Fuel Automated Management System. (General Accounting Office, Washington, DC (USA). Information Management and Technology Div.). 6 Sep 1983. 6p. US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760. Order Number TI84901192.

A report on a review of the Defense Fuel Automated Management System (DFAMS) is presented. DFAMS is designed as a fully automated integrated system which will handle inventory management, procurement, financial control and accounting for bulk fuel products within the Department of Defense. DFAMS software is being developed with obsolete and vendor-dependent programming techniques. These techniques will cause the delivered system to be unnecessarily costly to maintain and, if incompatible hardware is acquired, lead to high conversion cost. Many commercial software tools are available that run on computers which support ANSI COBOL and can assist in the planning and creation of application systems. It is believed DLA should consider the use of such tools to improve the quality of the DFAMS application software and reduce potential maintenance cost. DFAMS developers do not inspect program code for compliance with DLA, Defense, federal, or ANSI standards. Software tools could greatly reduce the labor of such inspection. The Normalization and ADPER programs appear to be sound ADP management strategies that should achieve DLA's goals of standardizing its software and becoming as machine independent as possible. However, DLA may have difficulty achieving these goals because, at least with DFAMS, it is not enforcing conformance with the Normalization objectives.

30245 (NP—4751453, pp 55-70) Norsk Hydro as offshore operator - potential cooperation with the Danish industry. Bergem, T. 1982. (In Norwegian). NTIS (US Sales Only), PC A12/MF A01. Order Number TI84751453.

In Norwegian-Danish offshore 82. Report.

Norsk Hydro is the Norwegian state controlled company which operates in North Sea oil fields. The company has some commitments on the British Shelf and participates in offshore projects in the Middle and Far East. A Danish-Norwegian syndicate can use Norsk Hydro for offshore development but the local industries have to be involved in equipment and other supplies. Cooperation has to establish industrial standard requirement and liability and control forms. Massive supplies of Danish and Norwegian supplies are possible and available in both North Sea ventures and on the world market.

30246 (NP—4751453, pp 176-188) Survey of potential Norwegian suppliers for offshore market. Kolltveit, B.J. 1982. (In Norwegian). NTIS (US Sales Only), PC A12/MF A01. Order Number TI84751453.

In Norwegian-Danish offshore 82. Report.

Norwegian industry has collected experience in offshore technology since 1971 when Ekofisk oil field had about 20% of Norwegian equipment. At present up to 80% are local supplies. On international offshore market Norwegian suppliers can propose know-how in documentation, consultation equipment, catering, technological cooperation etc.

30247 (NP—4770283) Italy - energy situation 1982. (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Feb 1984. 14p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770283.

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The general developments in the Italian energy policy are reported. End-use energy consumption and independence of imported energy are emphasized. National energy policy is commented on, i.e. the national energy programm, the energy conservation policy, and the plans for petroleum substitution.

30248 (P—300-83-008) Annual petroleum review. Volume 1. (California Energy Resources Conservation and Development Commission, Sacramento (USA)). Jul 1983. 213p. California Energy Commission, 1516 9th Street, MS-13, Sacramento, CA 95814. Order Number TI84901067.

Each year the California Energy Commission prepares the Annual Petroleum Review for the Governor and the Legislature for the purpose of conveying information about the current status of the supply and demand of petroleum products in California. The document is submitted under the provisions of the Petroleum Industry Information Reporting Act of 1980 (PIIRA), which directs the Commission to collect relevant information from petroleum companies operating in California and from other sources. This year the report has been divided into three separate documents: (1) the Executive Summary, (2) Volume 1, the Annual Petroleum Review report, and (3) Volume 2, the 1982 Annual Petroleum Review data section. Volume 1 contains background papers on: Outer Continental Shelf development, crude oil and gasoline pricing and industry supply and demand projections for 1983, natural gas policy and fuel switching, thermally enhanced oil recovery, and crude oil severance tax. 20 figures, 39 tables.

30249 **(P—300-83-009) Annual petroleum review. 1982 annual report to the Legislature. Volume 2.** (California Energy Resources Conservation and Development Commission, Sacramento (USA)). Jul 1983. 176p. California Energy Commission, 1516 9th Street, MS-13, Sacramento, CA 95814. Order Number TI84901068.

Each year the California Energy Commission prepares the Annual Petroleum Review for the Governor and the Legislature for the purpose of conveying information about the current status of the supply and demand of petroleum products in California. The document is submitted under the provisions of the Petroleum Industry Information Reporting Act of 1980 (PIIRA), which directs the Commission to collect relevant information from petroleum companies operating in California and from other sources. This year the report has been divided into three separate documents: (1) the Executive Summary, (2) Volume 1, the Annual Petroleum Review report, and (3) Volume 2, the 1982 Annual Petroleum Review data section. The data volume, Volume 2, is a review of annual statistics, collected under PIIRA, on the supply, demand, and prices of crude oil, refined petroleum products, and natural gas in California. Also included is information on the state's refining, storage, and petroleum transportation systems and on the financial status of petroleum companies operating in California.

0208 Waste Management

REFER ALSO TO CITATION(S) 30175, 31671

0209 Environmental Aspects

REFER ALSO TO CITATION(S) 30183, 31701

0210 Legislation And Regulation

30250 (NP—4751453, pp 256-264) **Offshore-syndicate contracts.** Arendorff, P.A. 1982. (In Danish). NTIS (US Sales Only), PC A12/MF A01. Order Number TI84751453.

In Norwegian-Danish offshore 82. Report.

Legal contracts concerning offshore supplies have to be drawn according to General Contract Conditions. Bidding systems, liabilities and cancellations are discussed, check-list of legal points given.

0230 Properties

REFER ALSO TO CITATION(S) 30470

0240 Storage

REFER ALSO TO CITATION(S) 30243

30251 **(AD-A—136948/7) Relationship between vehicle fuel temperature and ambient temperature. 1981 CRC (Coordinating Research Council) Kapuskasing field test. Final contractor report.** Strauss, K.H. (Coordinating Research Council, Inc., Atlanta, GA (USA)). Dec 1983. 81p. (CRC—537). NTIS, PC A05/MF A01.

A total of 214 overnight cooling curves, obtained on four diesel cars and three heavy-duty diesel trucks during January through April 1981 in Kapuskasing, Ontario, Canada, were analyzed to establish relationships between ambient and fuel tank temperatures. The closest relationship was found to be between fuel tank temperature at the end of an overnight cooldown and the average of the ambient temperature for the last three hours, the fuel being 2.2 C warmer on the average. The average difference between fuel tank and minimum ambient temperature was 3.6 C. No significant difference was observed between the final fuel tank temperatures of cars and the final fuel tank temperatures of the heavy-duty trucks, at the fill levels used in this program, when parked outdoors overnight.

30252 **(DOE/FE—0037/1) Strategic Petroleum Reserve. Quarterly report.** (USDOE Assistant Secretary for Environmental Protection, Safety and Emergency Preparedness, Washington, DC. Office of the Deputy Assistant Secretary for Strategic Petroleum Reserve). 15 May 1984. 13p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012794.

This quarterly report is presented in five sections. The introduction and summary briefly discuss the SPR program background and major activities during the first quarter of 1984. Site development is described in Section II and oil acquisition activities are reported in Section III. Other program topics are discussed in Section IV. Section V contains information on the budget and cost of the Reserve. During the first quarter of 1984, the Department of Energy continued its progress in the development of the SPR underground storage facilities. The SPR continues to be developed in three phases. Phase I, consisting of the St. James marine terminal and approximately 260 million barrels of storage capacity at five sites, was completed in 1980. Phase II capacity development, which consists of the expansion of storage capacity at three Phase I sites by a total of 290 million barrels, is 71 percent complete. Phase III development consists of the construction of a new 140-million-barrel site at Big Hill, Texas, and further expansion of Bryan Mount, West Hackberry, and Bayou Choctaw by a total of 60 million barrels. Phase III development is proceeding on schedule. During this quarter, the total inventory of oil stored in the SPR reached 391,793,070 barrels. The average fill rate was approximately 139,607 barrels per day bringing the average fill rate thus far in FY 1984 to 168,285 barrels per day. The weighted average delivered price of crude oil during this quarter was $29.81 per barrel. A successful drawdown exercise was conducted at the West Hackberry site on February 28 and 29, 1984. A total of 1,053,080 barrels were pumped from West Hackberry to the Sun Terminal over a 24-hour period, exceeding a test design level of 1,000,000 barrels per day. 2 tables.

03 NATURAL GAS

REFER ALSO TO CITATION(S) 30120, 30121

0301 Reserves

REFER ALSO TO CITATION(S) 30256

0302 Geology And Exploration

30253 **(DOE/MC/20342—1615) Analysis of stratigraphic barriers (caprock) between sands in the cretaceous Mesa Verde formation, US DOE Multiwell Experiment, Garfield County, Colorado.** Soeder, D.J. (Institute of Gas Technology, Chicago, IL (USA)). Mar 1984. Contract AC21-83MC20342. 45p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012934.

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Pressure differences between the caprock tests performed and the in-situ reservoir pressures at the Multiwell site preclude any conclusions as to whether drawdown of one sandstone could result in production from an adjacent sand by gas breaching the stratigraphic barriers. On the other hand, the caprock tests performed at IGT do provide the following useful conclusions: (1) In-situ water permeability of the stratigraphic barrier material is extremely low. (2) There is a fairly good inverse correlation between permeability to water and threshold pressure. (3) All of the permeability and threshold pressure data was taken on these samples in a vertical direction. Because of the layered and laminated structure of these rocks, one would expect to find far different numbers in a horizontal direction. This has implications with regard to horizontal flow between adjacent sand lenses at the same depth, as opposed to vertical flow between underlying and overlying sand bodies. (4) Although a few of the barrier cores appeared marginally adequate to transmit gas between sand units based on the CTA data, whether they will do so in the ground is doubtful. (5) The material most likely to allow gas migration between sand lenses was that in the

Coastal Zone. (6) It is far more likely that if gas migration occurs between sand lenses in the Multiwell, gas will move through the barrier material by way of natural or man-made fractures. Fracture permeability is probably many orders of magnitude higher than the ultra-tight shale and siltstone matrix, and threshold pressure in a fracture is quite low. The tests performed by IGT, however, were done on carefully chosen, unfractured core, and we have no information on the dynamics of gas movement through fractured stratigraphic barriers. The stratigraphic barrier material between sand lenses in the Mesa Verde at the Multiwell site would make an excellent caprock for an underground gas storage field. 11 figures, 2 tables.

30254 **Microcrack permeability in tight gas sandstone.** Ostensen, R.W. (Sandia National Laboratories). *SPEJ, Society of Petroleum Engineers Journal;* **23**: No. 6, 919-927(Dec 1983). Contract AC04-76DP00789.

A model of stress-dependent permeability was developed on the basis of flow through cracks. The compliance of the cracks is controlled by elastic deformation of a Gaussian distribution of surface asperities, indented into the opposing crack face. The theory was applied to data from tight gas sand cores, with the following results. 1. The theory explains the Jones and Owens permeability correlation[1] and predicts a modification of it that yields a better fit. 2. The slope of the permeability/stress curve on a loglog plot is predicted to be about 1.0, which agrees with the data. 3. The Jones and Owens Klinkenberg correlation supports a slit-like flow model and indicates that flow occurs along almost every grain boundary. 4. The size of the surface roughness was computed from the Klinkenberg factor and the slope of the permeability/stress curve. It is independent of stress, as predicted by the theory. 5. The porosity of tight sand cores decreases linearly with the log of net confining stress, in accordance with the Walsh-Grosenbaugh model of crack compressibility. This detailed agreement supports the theory and indicates that the permeability of tight gas sand cores is due to microcracks.

0303 Drilling, Production, And Processing

REFER ALSO TO CITATION(S) 30231, 30260

30255 **(ANL/EES-TM—248) Evaluation of zero-dimensional gas reservoir models.** Walbridge, E.W.; Lee, J.L.; Harrison, W. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 54p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84013102.

This report presents four tests for evaluating any zero-dimensional reservoir model. Using these tests, the general validity of the reservoir per se (RPS) and the standard zero-dimensional (SZD) gas reservoir models was determined. Neither model is generally valid as that term is herein defined. However, both models passed the reservoir-pressure lifetime history matching test for the Katy V-C and Chattian Main Sand gas reservoirs. Although the RPS model does poorly in estimating reservoir parameters from history matching when the match extends over the entire lifetime of the reservoir, it is better than the SZD model at predicting future reservoir pressures. The equations of the two models are described in detail, and the results of the individual tests are reported. 23 references, 17 figures, 4 tables.

30256 **National Petroleum Council study on unconventional gas.** D'Andrea, L. (US Dept. of Energy, Washington, DC). pp 621-628 of Proceedings 1981 international gas research conference. Rockville, MD; Government Institutes, Inc. (1981).

From International gas research conference; Los Angeles, CA, USA (28 Sep 1981).

The NPC study on unconventional gas sources in the US represents a major contribution to the knowledge and understanding of the recovery and production of gas from coal seams, Devonian shale, geopressured brine, and tight reservoirs. The council examined the resource base, recovery technology, potential reserves and production, and constraints and uncertainties related to each source. The overall conclusion is that these sources could be producing 3.8 trillion CF/yr by 1990 and up to 14.0 TCF by 2000, given the proper economic conditions and R and D initiatives.

0306 Marketing And Economics

REFER ALSO TO CITATION(S) 30242, 30245, 30248, 30249

0307 Waste Management

30257 **(DOE/EIA—0130(84/03)) Natural gas monthly.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). May 1984. 122p. NTIS, PC A06/MF A01; 1 - GPO; GPO Dep. Order Number DE84012495.

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Dry gas production during March 1984 was estimated at 13.5% above March 1983 production. Consumption of natural gas was 16.2% above the March 1983 level. A daily average residential consumption in February 1984 was down 16.8%, commercial consumption was down 19.5%, industrial consumption was up 57.6%, and electric utility consumption was up 2.1%. Working gas in underground storage reservoirs was 26.8% below the March 1983 level. During November 1983 to March 1984 41.6% more was used than during the 1982-83 withdrawal season. The average wellhead price of natural gas in January 1984 was $2.71 per thousand cubic feet (Mcf), up $.09 per Mcf. The average residential price of natural gas was $5.97 per Mcf up $.03 per Mcf. The average wellhead price projected for April 1984 was $2.70 per Mcf, down $0.13, for Old Gas, $1.47 per Mcf; for New Gas, $3.60 Mcf; and for High Cost Gas, $5.28 per Mcf. In April 1983 the prices projected for Old Gas, New Gas, and High Cost Gas averaged $1.45, $3.41, and $6.56 per Mcf, respectively. A selected group of natural gas companies estimated that 1.9 trillion cubic feet of surplus deliverability was available for off-system sales during April to September 1984.

0308 Environmental Effects

REFER ALSO TO CITATION(S) 30183, 31725

0309 Artificial Stimulation

REFER ALSO TO CITATION(S) 31363

30258 **(SAND—84-0908) Model for economic evaluation of high energy gas fracturing.** Engi, D. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 37p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012826.

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The HEGF/NPV model has been developed and adapted for interactive microcomputer calculations of the economic consequences of reservoir stimulation by high energy gas fracturing (HEGF) in naturally fractured formations. This model makes use of three individual models: a model of the stimulated reservoir, a model of the gas flow in this reservoir, and a model of the discounted expected net cash flow (net present value, or NPV) associated with the enhanced gas production. Nominal values of the input parameters, based on observed data and reasonable estimates, are used to calculate the initial expected increase in the average daily rate of production resulting from the Meigs County HEGF stimulation experiment. Agreement with the observed initial increase in rate is good. On the basis of this calculation, production from the Meigs County Well is not expected to be profitable, but the HEGF/NPV model probably provides conservative results. Furthermore, analyses of the sensitivity of the expected NPV to variations in the values of certain reservoir parameters suggest that the use of HEGF stimulation in somewhat more favorable formations is potentially profitable. 6 references, 4 figures, 3 tables.

30259 (SAND—84-0169-Vol.8-No.1, pp 18-23) **New borehole fracturing technique improves gas production.** May 1984. NTIS, PC A03/MF A01. Order Number TI84012270. Contract AC04-76DP00789.

In Sandia technology. Vol. 8, No. 1.

Sandia has developed a new multiple-fracturing technique to improve production in Devonian shale. The technique is based upon propellant deflagration and should be especially effective in formations where induced fracturing will connect natural fractures to the wellbore. Preliminary in-situ experiments conducted in ash-fall tuff at the Nevada Test Site gave positive results. Full-scale experiments were then conducted in Devonian shales of Roman County, Kentucky and Meigs County, Ohio. These experiments successfully demonstrated controlled multiple fracturing in Devonian shale and the ability of the technique to enhance gas production. 10 figures.

0310 Legislation And Regulation

30260 **(NP—4751453) Norwegian-Danish offshore 82. Report.** (Teknologistyrelsen, Copenhagen (Denmark). Formidlingsraadet). 1982. 268p. (In Norwegian). NTIS (US Sales Only), PC A12/MF A01. Order Number DE84751453.

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The Statoil and Norsk Hydro introduced a new iformation system about offshore operations in order to facilitate common marketing and direct contact with industry. Danish-Norwegian cooperation will help avoiding overlapping activities and enhance complementary solutions in relations with a third part, for inst. the Third world. Operators and managing contractors have more experience in Norwegian Offshore field, Danish industry can fill in where Norwegian capacity is insufficient. Rules, labor regulations, taxing legislation, unified contract requirements have to be harmonized. Consequent and long-range energy policy of both sides is necessary for industry to plan and invest in offshore development.

30261 **Principles of the administration's natural gas deregulation proposal.** Hodel, D. (Secretary of Energy U.S. Department of Energy). *Energy (Stamford, Connecticut);* **8**: No. 2, 16-17(1983).

The Natural Gas Consumer Regulatory Reform Amendments of 1983, S.615, the Reagan administration's proposal to decontrol natural gas, is now in front of Congress. The Administration's goal regarding natural gas is to move from a regulated to a free market, based on three key principles: freedom to negotiate new contracts; elimination of disincentives to produce and sell low-cost gas; and consumer protection.

0330 Properties

30262 **(DOE/MC/20013—T4) Laboratory analysis of gas hydrate cores for evaluation of reservoir conditions. For the months December 1, 1983-April 30, 1984.** Holder, G.D. (Holder (Gerald), Morgantown, WV (USA)). 1984. Contract AC21-83MC20013. 5p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012510.

The object of this work is to provide technical assistance to Morgantown Energy Technology Center's effort to develop a leading program in the evaluation of hydrate samples in porous media at reservoir conditions. During the period from January to March work done on the project focused on the preparation of the heat transfer and hydrate formation data and on the writing of the previous reports. During the last two months, including April, time has been devoted to the modification of our computer program to generate hydrate stability data in the earth. In addition to this work, the effect of gas composition on dissociation enthalpy is being studied.

30263 **(NP—4770311) Calculation equation of the condensation in hydrocarbon mixtures under the influence of heavy volatile components and taking hydrogen into consideration, using a thermal state equation.** Berndt, R. (Dortmund Univ. (Germany, F.R.). Abt. Chemietechnik). 3 Jun 1981. 139p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84770311.

Under certain process conditions a liquid phase can be formed in gas mixtures which contain heavy hydrocarbons. In order to define these conditions for various gaseous mixtures a simple and easy-to-handle equation was developed with which good results were achieved for melting point and flash calculations and with well reproduced boiling volumes. The comparative calculations are based on a model gas. The thermal equation of state was expanded to take into accout hydrocarbon-containing gas mixtures so that mixtures of this type can also be described.

04 OIL SHALES AND TAR SANDS

REFER ALSO TO CITATION(S) 30121

0401 Reserves And Exploration

REFER ALSO TO CITATION(S) 30256, 30265

30264 **(DOE/LC/10730—T1) Tar-sand potential of selected areas in Carter and Murray Counties, South-Central Oklahoma.** Harrison, W.E.; Burchfield, M.R. (Oklahoma Geological Survey, Norman (USA)). Feb 1984. Contract AS20-81LC10730. 226p. NTIS, PC A11/MF A01; 1; GPO Dep. Order Number DE84011242.

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The Department of Energy-Oklahoma Geological survey effort to evaluate the tar-sand potential of several sites in Carter and Murray Counties consisted of a 20-hole coring program, determination of bitumen content, and calculation of in-place bitumen content. Because of the good well control at the Sulphur Quarry area, the calculated volume of in-place bitumen is considered measured rather than probable. Where well control is less abundant in the Sulphur area, the calculated bitumen is in the probable category. The estimates for in-place bitumen at the Dougherty Quarry and Overbrook areas are also probable. The calculated bitumen at the South Woodford site is considered measured in the area defined by OGS cores and propable with reasonable extrapolations. Table 7 is a summary of in-place calculations for both measured and probable bitumen content at the Sulphur-Dougherty, Overbrook and South Woodford areas. Thus the potential for future tar-sand development at sites in Carter and Murray Counties appears to be quite high. The Sulphur and South Woodford areas offer the greatest possibilities for combined surface handling and in-situ programs, and together they constitute a resource base approaching 42 million barrels. Lack of detailed information makes it difficult to classify Dougherty and Overbrook potential as anything other than probable. The assumptions made in evaluating these two sites are geologically reasonable and somewhat conservative, however, and future studies could significantly alter the tar-sand potential of these areas. 23 references, 13 figures, 7 tables.

0402 Site Geology And Hydrology

30265 **(DOE/RA/32012—T20) Seismic evaluation of NOSR 2. Naval Oil Shale Reserves management support and systems engineering project.** (TRW Energy Engineering Div., McLean, VA (USA)). Jan 1982. Contract AC01-78RA32012. 47p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84006946.

In June 1981, the Department of Energy (DOE) elected to conduct a seismic evaluation of NOSR 2 in Utah. This survey was carried out by TRW for DOE as part of the resource assessment of the Naval Oil Shale Reserves. The objective of the seismic survey was to determine if there are any structures on the Reserve which may have trapped hydrocarbons. An evaluation of the results indicated the elongated anticlinal structure in the southeast corner (Tabyago Dome) does have dip reversal and that there is a closed structure. Centered in Section 21, T13S, R19E, that structure has a high probability of having trapped hydrocarbons. Any well drilled on that structure should test all the potential producing formations down to the Pre-Cambrian (15,000 feet). It is also possible that several stratigraphic traps exist on a north-trending anticline in R19E. The seismic survey was carried out during August-September 1981 when the Seismograph Service Corporation (SSC) shot an additional eight seismic lines over the entire Reserve. With the three existing commercial seismic lines, a total of 66.25 miles of seismic pro-

files were available for the evaluation. Additional geologic information from existing reports and data from producing areas which surround the Reserve also were used in making the final assessment. 9 references, 7 figures, 3 tables.

0403 Drilling, Fracturing, And Mining

REFER ALSO TO CITATION(S) 30270

30266 **(LA-UR—84-1558) Summary of the oil shale fragmentation program at Anvil Points Mine, Colorado.** Dick, R.D.; Young, C.; Fourney, W.L. (Los Alamos National Lab., NM (USA); Sunburst Recovery, Inc., Steamboat Springs, CO (USA); Maryland Univ., College Park (USA). Dept. of Mechanical Engineering). 1984. Contract W-7405-ENG-36. 26p. (CONF-8404121—6). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012636.

From 17. oil shale symposium; Golden, CO, USA (16 Apr 1984).

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During 1981 and 1982, an extensive oil shale fragmentation research program was conducted at the Anvil Points Mine near Rifle, Colorado. The primary goals were to investigate factors involved for adequate fragmentation of oil shale and to evaluate the feasibility of using the modified in situ retort (MIS) method for recovery of oil from oil shale. The test program included single-deck, single-borehole tests to obtain basic fragmentation data; multiple-borehole, multiple-deck explosive tests to evaluate practical aspects for developing an in situ retort; and the development of a variety of instrumentation techniques to diagnose the blasting event. This paper will present an outline of the field program, the type of instrumentation used, some typical results from the instrumentation, and a discussion of explosive engineering problems encountered over the course of the program. 4 references, 21 figures, 1 table.

0404 Oil Production, Recovery, And Refining

REFER ALSO TO CITATION(S) 30266, 30794

30267 **(BMFT-FB-T—83-293) Construction and operation of a pilot plant for further development of the LR-process.** Bussmann, A.; Dreher, I.; Grosse-Heitmeyer, J. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 77p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE84751251.

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1. Design and construction of a pilot plant for further development and the LR-Process. 2. Start-up and initial operation of the pilot plant. 3. Test runs with oil shales and coals of various origins. 4. Investigation of favourable process conditions for desulphurization of the flue gas through addition of $Ca(OH)_2$. 5. Wet scrubbing of the flue gas for the removal of SO_2 and particulates.

30268 **(DOE/RA/32012—T4) Conceptual process designs: Union B, Paraho, and Tosco II. Naval Oil Shale Reserves management support and systems engineering project.** (TRW Energy Engineering Div., McLean, VA (USA)). Feb 1981. Contract AC01-78RA32012. 134p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84006949.

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Four candidate retorting technologies - Tosco II, Paraho Direct, Paraho Indirect, and Union B optimized - are studied. Evaluation focuses upon those process aspects not within the battery limits of mining. Process streams are identified and depicted on flowsheets for the purpose of explanation. Much is shown to be common to all four schemes. This study has established a formal design basis for future work. Each system mets a pipeline-grade refinery-compatible oil specification, 1000 ppM nitrogen and 50 ppM sulfur. This analysis focuses on performing detailed heat and material balances around all major units (retorting, gas treatment, oil upgrading, wastewater treatment, etc.), optimizing the unit operations for energy and water consumption through proper process selection, defining environmental emissions from the plants, and providing the basis for preparing process flow diagrams, equipment lists, etc., for cost estimates. When completed, this information will be used to rank and screen the process options, and perform a preliminary design of the selected options. 32 figures, 14 tables.

30269 **(DOE/RA/32012—T16) Conceptual process designs: Lurgi-Ruhrgas and superior circular grate.** (TRW Energy Systems Planning Div., McLean, VA (USA)). Sep 1980. Contract AC01-78RA32012. 102p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84006899.

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Based on preliminary data on retort yields and previous conceptual designs, a Design Basis has been prepared, and an upgrading scheme developed against which all five retorting processes can be evaluated. Licensors for retorting technologies (American Lurgi Corporation for the Lurgi retort, Davy-McKee for the Superior Circular Grate retort, and Union Oil Company for the Union B retort); hydrotreaters (Gulf Oil and Chevron); wastewater treatment units (Chevron); and sulfur plants (Parsons) have been contacted for data related to their processes. Preliminary balances for the Lurgi and Superior processes have been developed and will be compared against the vendor information when received. A preliminary design basis is presented. This presents design assumptions and conditions to be used in developing the process designs, heat and material balances, and process flow diagrams for all cases. The shale oil upgrading scheme selected to be used in all evaluations consists of delayed coking the 850°F plus fraction from the shale oil, and hydrotreating all virgin and coker naphthas and gas oils in separate hydrotreaters. This scheme was selected because it is simple and each of the units has proven to be reliable in refining conventional crude oils. Also, this upgrading scheme is not expected to penalize any specific retort system. The material and utility balances, along with process flow diagrams for Case I, the Lurgi-Ruhrgas process are given. In this case, 46,500 bpsd of 29.4 °API upgraded shale oil are produced. The Superior Circular Grate material and utility balances and process flow diagrams are also given. The liquid product from this case is 40,500 bpsd of 27.4 °API upgraded shale oil.

30270 **(NMERDI—2-71-4604) Santa Rosa Oil Sands Project. Final technical report.** Forster, G.M. (Solv-Ex Corp., Albuquerque, NM (USA)). Mar 1984. 121p. NTIS, PC A06/MF A01. Order Number TI84901080.

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A continuous 25-barrel-per-day pilot plan to recover bitumen from tar sands was built and operated by Solv-Ex Corp. to test and develop its process for a proposed 4000 BPSD commercial plant at Santa Rosa, NM. A small test mine was opened near Santa Rosa and some s5000 tons of ore were mined and crushed for processing. A crater test program was carried out in the floor of the test mine. Crushing tests showed a low abrasivity with low fines generation enabling crushing equipment selections to be made. Capital and operating costs including surface mining for the 4000 BPSD were developed together with a favorable financial analysis and socioeconomic assessment. The environmental impact of the project was determined to be minimal with the plant designed to meet all current regulations. A chronological recounting of the history of the reserve estimates from 1933 is included with references. Whereas the project was based on an economically recoverable resource estimate of 19.2 million barrels of bitumen in ore of 4% or greater content (average 5.42%), an extensive 65-core hole exploration program failed to determine an adequate resource. A new tetrahydrofuran solvent extraction assay method was developed after discovery that the previously used loss on ignition method overstated the ore bitumen content. Finally on 942 acres, the average bitumen concentration was 3.78%; the mineable reserves was estimated at 8.8 million barrels with only a small amount recoverable at the projected mining cost of $10 per barrel. Consequently the project was terminated for economic reasons. 14 references, 6 figures, 10 tables.

30271 **(SAND—84-1088C) Measurement of frontal instability of two phase immiscible displacement in tar sands at reservoir conditions.** Lee, D.O.; Wayland, J.R.; Montoya, P.C. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 15p. (CONF-8406127—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012236.

From WRI/DOE tar sands symposium; Vail, CO, USA (27 Jun 1984).

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An instrumentation technique for the measurement of frontal instability of advancing oil and water fronts into core materials at reservoir conditions has been developed. The technique uses parallel open grid electrodes placed in good electrical contact within the confined core to measure conductance and capacitance. Also associated with each electrode is a thermocouple to give information associated with thermal fronts. Instabilities are identified by analysis of the changing capacitance and conductance induced by the movement of the front and its instabilities. This technique permits measurement of the velocity of the fronts, the fingers resulting from instability in the frontal advance, and the area and length of these fingers. A number of cases were investigated; these included brine front injection into a virgin core and oil displacement of a brine saturated silica core. As expected, in a relatively stable displacement the fingers moved at relatively slower velocities than the fronts, but not at a constant differential velocity. Often, considerable extension was observed to be reduced only at another stage of the displacement. This general technique can be adapted to core and laboratory-scaled physical models where information on frontal stability is important. 2 references, 12 figures.

30272 **Reaction kinetics for modeling oil shale retorting.** Campbell, J.H.; Burnham, A.K. *In Situ;* **4**: No. 1, 1-37(1980).

Lawrence Livermore Laboratory performed nonisothermal kinetic studies on the pyrolysis, gasification, and mineral reactions of oil shale, summarizing the resulting data in a set of rate equations suitable for the numerical modeling of oil-shale retorting. The rate equations are general enough for modeling both in situ and surface retorting processes. The specific pyrolysis reactions investigated included the decomposition of kerogen and the corresponding evolution of oil, H_2, CH_2, and C_2 and C_3 hydrocarbons and the secondary pyrolysis of the carbonaceous residue and the evolution of H_2 and CH_4. The mineral-reaction kinetics relate to the decomposition and reaction of calcite, dolomite, dawsonite, and nahcolite and the effects of CO_2 and steam on the reactions of calcite and dolomite. The kinetic study also examined the gasification of the carbonaceous residue by CO_2 and H_2O.

0405 Properties And Composition

REFER ALSO TO CITATION(S) 30441

30273 **(UCRL—90221) Mass and heat transfer in crushed oil shale.** Carley, J.F.; Straub, J.S.; Ott, L.L. (Lawrence Livermore National Lab., CA (USA)). Apr 1984. Contract W-7405-ENG-48. 15p. (CONF-8404121—7). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012614.

From 17. oil shale symposium; Golden, CO, USA (16 Apr 1984).

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Heat and mass transfer between gases and oil-shale particles are both important for all proposed retorting processes. Past studies of transfer in packed beds, which have disagreed substantially in their results, have nearly all been done with beds of regular particles of uniform size, whereas oil-shale retorting involves particles of diverse shapes and widely ranging sizes. To resolve these questions, we have made 349 runs in which we measured mass-transfer rates from naphthalene particles of diverse shapes buried in packed beds through which air was passed at room temperature. This technique permits calculation of the mass-transfer coefficient for each active particle in the bed rather than, as in most past studies, for the bed as a whole. The data were analyzed in two ways: (1) by the traditional correlation of Colburn j/sub D/ vs Reynolds number and (2) by multiple regression of the mass-transfer coefficient on air rate, traditional correlation of Colburn j/sub D/ vs Reynolds number and (3) by multiple regression of the mass-transfer coefficient on air rate, sizes of active and inert particles, void fraction, and temperature. Principal findings are: (1) local Reynolds number should be based on active particle size rather than average size for the bed; (2) no appreciable differences were seen between shallow beds and deep ones; (3) mass transfer was 26% faster for spheres and lozenges buried in shale than for all-sphere beds; (4) orientation of lozenges in shale beds has little effect on mass-transfer rate; (5) a useful summarizing equation for either mass or heat transfer in shale beds is $\log j_\epsilon = -.0747 - .6344 \log Re + .0592 \log^2 Re$ where j = either j/sub D/ or j/sub H/, the Chilton-Colburn j-factors for mass and heat transfer, Re = the Reynolds number defined for packed beds, and ϵ = the void fraction in the bed. 12 references, 15 figures.

0407 Health And Safety

30274 **(UCRL—15612) Hydrocarbon-induced cancer risks in oil shale processing.** Savitz, D.A.; Marine, W.M.; Gratt, L.B.; Perry, B.W. (Colorado Univ., Denver (USA). Health Sciences Center; IWG Corp., San Diego, CA (USA)). Apr 1984. Contract W-7405-ENG-48. 10p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84013224.

An estimate of occupational cancer risks due to hydrocarbon exposure during retorting, upgrading, and transportation was derived using epidemiological studies in a surrogate industry. The oil refining industry was selected as a surrogate with the goal of adjusting that workforce's risk based upon toxicologic and exposure data. Risk estimates were derived for those cancers which may be excessive in refinery workers, namely lung, stomach, kidney, brain, and skin cancer. The magnitude of health risks for these diseases was very small, with the estimated 15,000 exposed workers suffering 3.7 excess internal cancers per year and 21 excess skin cancers per year. This morbidity would be expected to produce about 3 deaths per year. In spite of considerable uncertainty regarding these figures, the conclusion that hydrocarbon-induced cancers are overshadowed by dust-related respiratory disease as an occupational health risk in the oil shale industry is warranted. The implications of these results for further health research and industrial hygiene practices are discussed. 34 references, 3 tables.

0408 Marketing And Economics

30275 **(ANL/EES-TM—249) Areawide and local effects of tar sands development at the sunnyside site in Utah: a socioeconomic analysis.** South, D.W.; Nagle, J.C.; Nagle, J.W.; Rose, K.J.; Winter, R.C. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 263p. NTIS, PC A12/MF A01; 1; GPO Dep. Order Number DE84013182.

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This report evaluates the socioeconomic consequences of developing the tar sands in the Sunnyside STSA in east-central Utah. Effects of tar sands development were examined on several levels: areawide, county, census county division (CCD), and community. Effects were projected over the 20-year period from 1985 to 2005 and are described for the five window years of 1985, 1990, 1995, 2000, and 2005. To prepare this analysis, a four-step procedure was followed. First, the existing social and economic conditions of the area were described. Second, conditions were projected for the 20-year period under the assumption that no tar sands resources are developed. Third, the proposed tar sands developments were described. The descriptions included estimates of (1) production levels and (2) the work force required to mine the tar sands and to construct and operate the accompanying retort facilities. Finally, the impacts of these developments were projected for the 20-year period and then analyzed. In addition to tar sands development, the development of other energy resources (coal mines and an off-tract tar sands project) in the same area within Utah were examined. The socioeconomic impacts of these developments were estimated and added to the projected impacts of the tar sands developments. Two socioeconomic models were used to collect and analyze data. The Utah Process Economic and Demographic (UPED) impact model

was used to project aggregate impacts under the baseline conditions, the three scenarios for tar sands development, and the two scenarios for development of other energy resources. After these impacts were projected, the Spatial Allocation Model (SAM) was used to distribute the impacts among the communities, CCDs, and counties. 30 figures, 88 tables.

0409 Waste Research And Management

REFER ALSO TO CITATION(S) 30267

30276 **Biological oxidation of organic constituents in tar-sand combustion-process water.** Torpy, M.F.; Luthy, R.G.; Raphaelian, L.A. (Energy and Environmental Systems Division, Argonne National Laboratory, Argonne, IL). *Biotechnology and Bioengineering;* **25**: No. 12, 3163-3176(Dec 1983).

A study was performed to characterize a sample of reverse-forward, tar-sand combustion process water, and to conduct an initial evaluation of activated sludge treatment of the process water. No pretreatment of the waste water was considered necessary prior to biological oxidation other than addition of ca. 0.006M caustic/L influent to maintain reactor pH in the desired range of 7.0-7.5. The process water was treated successfully by biological oxidation, achieving an 88% reduction of both COD and soluble organic carbon and a 97% reduction of BOD. The disposition of about 150 organic compounds was evaluated and it was shown that a variety of carboxylic acids and aromatic compounds were removed by treatment. Quinolines and certain higher molecular weight carboxylic acids were not removed as effectively as other compounds. These preliminary results should assist in the design of future investigations with tar-sand process water for purposes of optimizing process treatment and improving sample characterization.

05 NUCLEAR FUELS

0501 Reserves

REFER ALSO TO CITATION(S) 30792, 31708

30277 **(NP—4901167) Catahoula formation of the Texas Coastal Plain: origin, geochemical evolution, and characteristics of uranium deposits.** Galloway, W.E.; Kaiser, W.R. (Texas Univ., Austin (USA). Bureau of Economic Geology). 1980. 85p. Univ. of Texas, Austin, TX 87812. Order Number TI84901167.

Report of Investigations No. 100.

This report is the product of a study of the distribution, genesis, and potential of uranium resources in the Catahoula Formation, and emphasizes both the geochemical and hydrologic habitats of known uranium deposits and the geochemical evolution of uranium within a coastal plain aquifer system. The similar evolutionary patterns of Coastal Plain aquifers, combined with geologic attributes of the Catahoula depositional systems and their contained uranium deposits, suggest a generalized uranium cycle of mobilization, migration, and accumulation consisting of two distinct phases. The primary mineralization included four events, which are essentially contemporaneous: (1) uranium was released from volcanic ash by reactions occurring at shallow depths soon after deposition; (2) mobilized uranium entered the ground-water flow system in areas of regional ground-water recharge; (3) reactive, oxidizing ground water containing dissolved uranium migrated through semi-confined aquifers, producing salients of altered ground within regionally reduced portions of the aquifer system; and (4) uranium and other metals were concentrated along the interface between altered and unaltered portions of the aquifers as flow traversed the abrupt Eh and associated pH gradients extant at this boundary. The modification phase includes later events that have modified and obscured primary mineralization patterns. 84 references, 56 figures, 8 tables.

30278 **(NP—4901170) Epigenetic zonation and fluid flow history of uranium-bearing fluvial aquifer systems, south Texas uranium province. Report of Investigations No. 119.** Galloway, W.E. (Texas Univ., Austin (USA). Bureau of Economic Geology). 1982. 33p. Bureau of Economic Geology, Univ. of Texas, Austin, TX 78712. Order Number TI84901170.

The Oligocene-Miocene fluvial uranium host aquifers of the South Texas uranium province were deposited principally as syndepositionally oxidized sands and muds. Early intrusion of reactive sulfide-enriched waters produced large intrastratal islands of epigenetic sulfidic alteration, which contain isotopically heavy pyrite exhibiting unique replacement textures. The only known reservoir containing such sulfidic waters is the deeply buried Mesozoic carbonate section beneath the thick, geopressured Tertiary basin fill. Thermobaric waters were expulsed upward along major fault zones into shallow aquifers in response to a pressure head generated by compaction and dehydration in the abyssal ground-water regime. Vertical migration of gaseous hydrogen sulfide was less important. Repeated flushing of the shallow aquifers by oxidizing meteoric waters containing anomalous amounts of uranium, selenium, and molybdenum alternating with sulfidic thermobaric waters caused cyclic precipitation and oxidation of iron disulfide. Uranium deposits formed along hydrologically active oxidation interfaces separating epigenetic sulfidic and epigenetic oxidation zones. Multiple epigenetic events are recorded in imperfectly superimposed, multiple mineralization fronts, in regional and local geometric relations between different alteration zones, and in the bulk matrix geochemistry and mineralogy of alteration zones. The dynamic mineralization model described in this report may reflect processes active in many large, depositionally active basins.

0502 Exploration

30279 **(GJBX—40(83)) National Uranium Resource Evaluation stream-sediment, hydrogeochemical, and aeromagnetic data characteristics of the Piedmont Region, eastern United States: a data release.** Madson, M.E.; Rush, S.F.; Hardy, L.C.; LaBonte, N.E.; Ludlam, J.R. (Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations). Nov 1983. Contract AC07-76GJ01664. 22p. H. Order Number TI84002619.

Characteristics of National Uranium Resource Evaluation (NURE) stream-sediment, hydrogeochemical, and aeromagnetic data for sixteen contiguous 1° x 2° National Topographic Map Series (NTMS) quadrangles in the eastern United States are presented in this report. The work is limited in scope to features of specific interest to the geoscience community, even though NURE data may implicitly relate to such other fields as agriculture and land-use planning. The data used to produce the residual aeromagnetic and geochemical maps in this report have been previously open-filed. The tectonic map and the igneous rock distribution map were compiled from published, larger scale maps. When used together, these maps show geochemical, tectonic, and magnetic features unique to many of the geologic and physiographic provinces in the region.

30280 **(GSCan-P—81-23) Uranium in granites. Proceedings of a workshop.** Maurice, Y.T. (ed.). (Geological Survey of Canada, Ottawa, Ontario). 1982. 183p. (CONF-8011208—). NTIS (US Sales Only), PC A09/MF A01. Order Number DE84701838.

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Recent research activities of the Canadian Uranium in Granites Study are presented in 18 papers and 3 abstracts. 'Granites' is used as a generic term for granitoids, granitic rocks, and plutonic rocks.

30281 **(GSCan-P—81-23, pp 1-10) 'Hot' granites. Some general remarks.** Darnley, A.G. (Geological Survey of Canada, Ottawa, Ontario). 1982. 8. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

A small proportion of granitic (and syenitic) rocks contain above normal radioelement concentrations. Under a favourable combination of structural and hydrological conditions the heat generating capacity of these 'hot' granites is significant with respect to low temperature mineralizing processes. Uraniferous granites constitute a special class and Hercynian examples suggest that certain gross compositional and alteration features are indicative of genetically associated uranium mineralization. In western Canada a linear negative gravity anomaly extending 1600 km from Edmontom to Baker Lake is coincident with a zone of high uranium, mostly in granitoid rocks, which is in the exposed Shield NE of the Athabasca basin, and present in the prairie Precambrian basement to the SW. The gravity anomalies can be traced beneath the Athabasca basin with the inference that there is associated high uranium. This combined gravity-radioelement linear anomaly is termed the Athabasca axis. There is some evidence to suggest it developed through crustal tension. The rich mineralization of the Athabasca basin can be attributed to the favourable conjunction of heat sources, source material, hydrology, and structure, in turn attributable to the Athabasca axis which has deep crustal or mantle connections. General questions are posed as to the distribution of 'hot' granites in time, their origins and tectonic associations, and their possible significance with respect to the stabilization of cratons.

30282 (GSCan-P—81-23, pp 11-17) **Geochemistry and the distribution of uranium and thorium in the granitoid rocks of the south mountain batholith, Nova Scotia. Some genetic and exploration implications.** Chaterjee, A.K. (Nova Scotia Dept. of Mines and Energy, Halifax (Canada)); Muecke, G.K. (Dalhousie Univ., Halifax, Nova Scotia (Canada)). 1982. B. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

The peraluminous South Mountain Batholith (SMB) of Nova Scotia consists of a cogenetic granitoid suite ranging in composition from biotite granodiorites to highly leucocratic monzogranites. Economically significant U-Sn prospects and numerous occurrences show a close spatial and genetic association with the more highly differential phases of the SMB, and in particular with a paraintrusive suite developed in these bodies. In the cogenetic suite uranium concentrations increase progressively with differentiation, but thorium follows two distinct trends. Thorium concentrations and Th/U ratios decrease with differentiation in the New Ross complex, and the Lake George, East Dalhousie and West Dalhousie plutons. However, in the Davis Lake and Plymouth plutons thorium values increase concomitantly with uranium enrichment. Airborne gamma ray spectrometric maps have been used to distinguish areas of high total radioactivity (i.e. highly differentiated) and high thorium values within the batholith. Such areas correspond to bodies showing the thorium-enrichment trend and are concentrated near the margins of the batholith. Major U-Sn occurrences in the batholith appear to be preferentially associated with these bodies and airborne gamma ray spectrometric surveys provide information on the location of such bodies in less well known parts of the batholith. The strong enrichment such as Li, Be, F, Rb, Cs, U, and Sn in members of the paraintrusive suite provides another possible lithogeochemical exploration tool.

0503 Mining

REFER ALSO TO CITATION(S) 30390, 30392

0504 Feed Processing

30283 **(ERP/MSL—81-43(TR)) Chlorine-assisted leaching of Key Lake uranium ore.** Haque, K.E. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Apr 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701835.

Bench-scale chlorine-assisted leach tests were conducted on the Key Lake uranium ore. Leach tests conducted at 80° C on a slurry containing 50% solids during 10 hours of agitation gave the maximum extraction of uranium - 96% and radium-226 - 91%. Chlorine was added at 23.0 Kg Cl_2/tonne of ore to maintain the leach slurry pH in the range of 1.5-1.0. To obtain residue almost free of radionuclides, hydrochloric acid leaches were conducted on the first stage leach residues. The second stage leach residue still was found to contain uranium - 0.0076% and radium-226 - 200 pCi/g of solids.

30284 **(ERP/MSL—81-70(TR)) Removal of radioactive radium (Ra^{226}) from chloride liquors by columnar ion exchange in the presence of calcium, magnesium and iron cations. Progress report No. 3.** Gilmore, A.J. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Jun 1981. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701848.

The purpose of this work was to study the feasibility of controlling the discharge of soluble Ra^{226}, in the presence of Ca, Mg and Fe cations in synthetic chloride effluents, by adsorption on cation exchange resins to decrease Ra^{226}-concentrations to federal environmental levels of 10 pCi Ra^{226}/litre. Environmentally acceptable effluents were produced from synthetic chloride feed liquors containing 10 ppm Ca, 5 ppm Mg, 120 ppm Fe plus 20,000 pCi Ra^{226}/litre. Environmentally acceptable effluents were not produced, by cation exchange, from a synthetic chloride liquor containing 490 ppm Ca, 97 ppm Mg, 720 ppm Fe in addition to 20,000 pCi Ra^{226}/litre. The mass interference of the Ca + Mg + Fe cation concentrations in the feed liquor was in over-powering competition, for resin sites, with the Ra^{226}-cations. To obtain realistic data, the adsorption process should be reexamined using a chloride liquor produced under optimal chloride leaching conditions of an Elliot Lake uranium ore. This would, in all probability, reveal other cations unavailable in the synthetic chloride liquors.

30285 **(ERP/MSL—81-128(TR)) Hydrochloric acid leach of Agnew Lake uranium concentrate.** Haque, K.E.; Ipekoglue, B. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Oct 1981. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701847.

Hydrochloric acid leaching was conducted on the radioactive mineral concentrate separated from the Agenw Lake uranium ore. Leach tests conducted at the optimum conditions (75° C; 36 hours; 66.0 Kg HCl/tonne; solid:liquid -1:1) resulted in the extraction of 87% uranium and 84% radium. The radionuclide level of the residue was U-0.016%, Th-0.24% and Ra-65 pCi/g solids. However to obtain a residue almost free of radium (i.e., Ra level at the detection limit: 4-6 pCi/g solids), the first stage leach residue was further treated with hydrochloric acid. The radium level in the best second stage leach residue was also above the target level. Therefore, multistage (3 or 4) hydrochloric acid and/or neutral chloride leaching is recommended to obtain tailings almost free of radionuclide.

30286 **(ERP/MSL—81-138(TR)) Hydrochloric acid leaching of Rabbit Lake uranium ore.** Haque, K.E. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Nov 1981. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701833.

Bench-scale hydrochloric acid leachings were conducted on the Rabbit Lake uranium ore. Leach conditions maintained at 60° C, 88.0 kg HCl/tonne solids, 10 hours retention time and 50 % solids in slurries provided the highest percent extractions of uranium-96 % and radium-79 %. However, to obtain residues almost free of radium (i.e. to bring radium level almost down to the lower limit of detection: 4-6 pCi/g solids) first-stage leach residues were treated with hydrochloric acid. Because the best second-stage leach residue contained 150 pCi Ra/g, further leaching with 2M KCl was conducted in the 3rd and 4th stages. However, radium at 90 pCi/g solids was still present in the fourth stage leach residue. To obtain residues almost free of radionuclides further investigations are necessary to find a suitable leachant and leach conditions.

0505 Enrichment

REFER ALSO TO CITATION(S) 30399, 31413

30287 (UVA-ER—914-84U) Flow in a tapered centrifuge . Greenspan, H.P. (Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Mathematics). Mar 1984. Contract AC05-82OR20900. 21p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012553.

Flow in a relatively short, tapered centrifuge is examined. The problem is formulated, various boundary layer regimes are analyzed, and the principal mass fluxes are calculated for general temperature and wall conditions. 3 references, 2 figures.

30288 A gas-phase UF_6 enrichment monitor. Strittmatter, R.B. (Los Alamos National Laboratory P.O. Box 1663, Los Alamos, New Mexico 87545). *Nuclear Technology;* **59**: No. 2, 355-362(Nov 1982).

A NaI(Tl)-based in-line enrichment monitor has been developed for the gas-phase UF_6 feed stream of an enrichment plant to provide real-time material accountancy and/or containment-surveillance data. The method has produced assay results that are independent of operating UF_6 pressure, with an assay accuracy of better than 1% (1σ) relative over the range of UF_6 enrichments of 0.72 to 5.4 at %. For 1.0%-enriched UF_6 at 700 Torr, a 0.74% relative precision was obtained for a 1000-s counting time. As a result of these measurements, an in-line gas phase enrichment monitor has been installed in the Paducah-product feed line of the Oak Ridge Gaseous Diffusion Plant for field test and evaluation.

0507 Fuels Production And Properties

REFER ALSO TO CITATION(S) 30304, 30305, 30307, 31307, 31308, 31309, 31310, 31311

30289 (BARC—1185) Hot vacuum outgassing to ensure low hydrogen content in MOX fuel pellets for thermal reactors. Majumdar, S.; Nair, M.R.; Kumar, Arun. (Bhabha Atomic Research Centre, Bombay (India)). 1983. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701730.

Hot vacuum outgassing treatment to ensure low hydrogen content in Mixed Oxide Fuel (MOX) pellets for thermal reactors has been described. Hypostoichiometric sintered MOX pellets retain more hydrogen than UO_2 pellets. The hydrogen content further increases with the addition of admixed lubricant and pore formers. However, low hydrogen content in the MOX pellets can be ensured by a hot vacuum outgassing treatment at a temperature between 773K to 823K for 2 hrs.

30290 (IAEA-R—3024-F) Passive-X-ray fluorescence determination of the plutonium and uranium ratio in burnt-up fuel. Final report for the period 1 December 1981 - 30 November 1982. Zhelev, Z. (International Atomic Energy Agency, Vienna (Austria)). May 1983. 26p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701732.

This non-destructive method was proposed for comparatively simple and not labour-intensive determination of the Pu and U ratio in WWER-440 (PWR type) reactor spent fuel. For this purpose the mini-tablets (2mm and length 5mm) were irradiated for 65 and 130 days in dry channel of the WWER-440 reactor passed through its active core. The ratio of Pu and U and ratio of the isotopes ^{134}Cs and ^{137}Cs were determined by means of KX-rays and gamma-scanning analyses correspondingly. It was shown that there was a simple functional dependance between the ratio of Pu and U and the ratio of Cs isotopes.

30291 (INIS-mf—8962, pp H10) **Investigation of the ammonium-uranyl-carbonate route for the production of sintered UO_2 pellets.** Vankin, S.; Lorber, A.; Halachmy, M. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

30292 (LA-tr—82-3) Automatic chemical determination facility for plutonium and uranium. Benhamou, A. Translated from *Analusis ;* **8**: No. 8, 367-371(1980). Contract W-7405-ENG-36. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014225. DE82014225

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This paper describes a proposal for a fully automated chemical determination system for uranium and plutonium in (U, Pu)O_2 mixed oxide fuel, from the solid sample weighing operation to the final result. The steps completed to data are described. These include: test sample preparation by weighing; potentiometer titration system; and cleaning and drying of glassware after titration. The process uses a Mettler SR 10 Titrator System in conjunction with other automatized equipment. Precision may reach 0.02% and is generally better than 0.1%. Accuracy within +- 0.1% of manual determination results or titration standards.

0508 Spent Fuels Reprocessing

REFER ALSO TO CITATION(S) 30301, 30350, 30394, 30396, 30408, 30409, 30410, 30411, 30412, 30413, 30414, 30766, 31277, 31282, 31283

30293 (CONF-840413—6) State-of-the-art Model M-2 Maintenance System. Herndon, J.N.; Martin, H.L.; Satterlee, P.E. Jr.; Jelatis, D.G.; Jennrich, C.E. (Oak Ridge National Lab., TN (USA); Sargent Industries, Inc., Red Wing, MN (USA). Central Research Labs. Div.). Apr 1984. Contract AC05-84OR21400. 21p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011645.

From Topical meeting on robotics and remote handling in hostile environments; Gatlinburg, TN, USA (23 Apr 1984).

The Model M-2 Maintenance System is part of an ongoing program within the Consolidated Fuel Reprocessing Program (CFRP) at Oak Ridge National Laboratory (ORNL) to improve remote manipulation technology for future nuclear fuel reprocessing and other remote applications. Techniques, equipment, and guidelines which can improve the efficiency of remote maintenance are being developed. The Model M-2 Maintenance System, installed in the Integrated Equipment Test (IET) Facility at ORNL, provides a complete, integrated remote maintenance system for the demonstration and development of remote maintenance techniques. The system comprises a pair of force-reflecting servomanipulator arms, television viewing, lighting, and auxiliary lifting capabilities, thereby allowing manlike maintenance operations to be executed remotely within the remote cell mockup area in the IET. The Model M-2 Maintenance System incorporates an upgraded version of the proven Central Research Laboratories' Model M servomanipulator. Included are state-of-the-art brushless dc servomotors for improved performance, remotely removable wrist assemblies, geared azimuth drive, and a distributed microprocessor-based digital control system. 5 references, 8 figures.

30294 (DP—1680) Two-stage precipitation of plutonium trifluoride. Luerkens, D.W. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). Apr 1984. Contract AC09-76SR00001. 37p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012830.

Plutonium trifluoride was precipitated using a two-stage precipitation system. A series of precipitation experiments identified the significant process variables affecting precipitate characteristics. A mathematical precipitation model was developed which was based on the formation of plutonium fluoride complexes. The precipitation model relates all process variables, in a single equation, to a single parameter that can be used to control particle characteristics.

30295 (INIS-mf—8961, pp 290-305) **Automation of laboratory extraction installation intended for investigations in the field of reprocessing of spent fuels.** Vznuzdaev, E.A.; Galkin, B.Ya.; Gofman, F.Eh. (and others). 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

Automatized stand for solving the problem of optimum control on technological extraction process in the spent fuel reprocessing by means of an automatized control system which is based on the means of computation technick is described in the paper. Preliminary experiments which had been conducted on the stand with spent fuel from WWER-440 reactor have shown high efficiency of automation and possibility to conduct technological investigations in a short period of time and to have much of the information which can not be obtained by ordinary organisation of work.

30296 (INIS-mf—8962, pp E3) **Radiochemical measurements of surface corrosion influenced by α-emitters.** Erben, W.; Bestanpouri, A.; Marx, G. (Freie Univ. Berlin (Germany, F.R.). Inst. fuer Anorganische und Analytische Chemie); Naegele, J.; Mueller, W. (Europaeisches Institut fuer Transurane, Karlsruhe (Germany, F.R.)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

30297 (NIIAR—50(565)) **Fluorination of irradiated uranium-plutonium oxide fuel in flame reactor.** Dem'yanovich, M.A.; Prusakov, V.N.; Skiba, O.V.; Sokolovskij, Yu.S.; Serov, A.V.; Churin, G.V.; Chernyshov, V.N.; Maslakov, G.I.; Shchekal, Yu.P.; Trotsenko, N.M. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701834.

The feasibility of plutonium oxide to hexafluoride conversion has been assessed during the fluorination of the uranium-plutonium fuel in the flame reactor of the facility FREGAT. The mechanically mixed uranium and plutonium oxide related as 4:1, and the uranium-plutonium fuel irradiated in the BOR-60 reactor to 10.4% h. a. burnup have been fluorinated. The data has been obtianed on uranium and plutonium decontamination while fuloride volatility processing the mixed fuel.

30298 (UCID—20016) **Evaluation of nonaqueous processes for nuclear materials.** Musgrave, B.C.; Grens, J.Z.; Knighton, J.B.; Coops, M.S. (Lawrence Livermore National Lab., CA (USA)). Dec 1983. Contract W-7405-ENG-48. 49p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012827.

A working group was assigned the task of evaluating the status of nonaqueous processes for nuclear materials and the prospects for successful deployment of these technologies in the future. In the initial evaluation, the study was narrowed to the pyrochemical/pyrometallurgical processes closely related to the processes used for purification of plutonium and its conversion to metal. The status of the chemistry and process hardware were reviewed and the development needs in both chemistry and process equipment technology were evaluated. Finally, the requirements were established for successful deployment of this technology. The status of the technology was evaluated along three lines: (1) first the current applications were examined for completeness, (2) an attempt was made to construct closed-cycle flow sheets for several proposed applications, (3) and finally the status of technical development and future development needs for general applications were reviewed. By using these three evaluations, three different perspectives were constructed that together present a clear picture of how complete the technical development of these processes are.

30299 (LA-tr—83-28) **Continuous α-measurement in the process solutions of a reprocessing plant. Comparison of two commercial devices.** Roemer, J.; Groll, P. Translated from *KFK-Nachrichten ;* **14**: 184-187(1982). Contract W-7405-ENG-36. 11p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84004465. DE84004465

Knowledge of the concentration of plutonium in the various process streams, in addition to other components, is of great importance to the chemical reprocessing of irradiated nuclear fuels from light water reactors. These determinations are usually made by a regular laboratory analysis of drawn samples. In this case, considerable time may elapse between the taking of the sample and the availability of the measured result. In addition, the time delay in the detection of changes in concentration will depend on the sampling frequency. This time loss, which may make the process control difficult, can be eliminated by the use of suitable in-line equipment. One method for measuring plutonium concentrations in solutions is based on the determination of the α-radiation emitted by this element. The On Line Alpha Monitor (OLAM) and the drum-measurement cell well compared. The α-monitor OLAM showed in tests that the specifications are accurate for pure aqueous or organic plutonium solutions. In addition, it is a compact device composed of few parts subtect to failure. Its sensitivity permits it to measure accurately in the concentration range below 1 mg/llPu. However, even solutions with 1 to 2% dispersed components caused large increases in the background rate. This contamination of the detector surface increased drastically when using pure process solutions; in this case, when measuring a medium-activity waste solution. The drum cell is surely more likely to break down due to its moving pparts. In addition, its sensitivity is less due to the detector spacing, but it is sufficient to perform measurements in the concentration range from 1 to 10 mg/1 Pu. It is completely insensitive to deposits of plutonium, due to its design. 11 references, 4 figures.

0509 Transport And Storage

REFER ALSO TO CITATION(S) 30319

30300 (EPRI-NP—3380) **Cost comparisons for on-site spent-fuel storage options. Final report.** McCartney, J.S.; Cairns, R.B. (Boeing Engineering and Construction Co., Seattle, WA (USA)). May 1984. 192p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920410.

This final report presents a comprehensive set of reference data which utilities may use to evaluate at-reactor spent fuel storage options. The report provides comparative cost and schedule data describing pool, drywell, vault, cask, silo, reracking, double tiering, and rod consolidation storage options. Also provided are truck and rail transportation costs. All the data presented have been extracted from referenced sources. Data normalization has been necessary but is limited principally to adjustment of costs to January 1983 dollars, and in some cases, to the addition of cost contingencies. Normalization procedures are fully described.

30301 (INIS-mf—8961, pp 38-50) **Some aspects of spent nuclear fuel handling.** Rybalchenko, I.L.; Kolton, G.F. 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

The paper reviews on the modern aspects of handling spent nuclear fuels, including problems of storage of the spent fuels, their reprocessing and development of international projects for the nuclear fuel cycle. Activities of the IAEA in this direction are reviewed.

30302 (INIS-mf—8961, pp 62-76) **Storage of spent fuel of nuclear power plant with WWER-440 reactors.** Sedov, V.M.; Kondrat'ev, A.N.; Kijko, I.E.; Danolov, S.G.; Dusaev, N.M.; Snaginskij, B.I. 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

Main solutions are stated in the paper of construction and exploitation of the stores for spent nuclear fuels. Tasks are stated for further investigations on problems of long-term storage of spent nuclear fuels from WWER-440 reactors.

30303 (NUREG/CP—0048-Vol.6, pp 74-81) **Performance of artificially defected LWR fuel rods in an unlimited dry air storage atmosphere.** Einziger, R.E.; Knecht. R.L.; Cantley, D.A.; Cook, J.A. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

In 1982 a program was begun to provide the Nuclear Regulatory Commission (NRC) with information needed to evaluate proposals for dry storage of spent fuel relative to (1) the long-term, low-temperature (less than 250°C) behavior of spent fuel, and (2) the radioactive contamination potential of crud from cladding. The need for this information, the bases for use of whole fuel rods in this testing program, the test matrix, the apparatus description and rod characterization were discussed at the NRC 10th Water Reactor Safety Research Information Meeting last year and is only briefly reviewed. This paper describes the test results.

30304 (NUREG/CP—0049) **Workshop on spent fuel/cladding reaction during dry storage.** Reisenweaver, D.W. (ed.). (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Technology). Mar 1984. 511p. (CONF-830897—). NTIS, PC A22/MF A01 - GPO* $9.50. Order Number DE84901063.

From NRC workshop on spent fuel/cladding reactions during dry storage; Gaithersburg, MD, USA (17 Sep 1983).

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Separate abstracts were prepared for six papers.

30305 (NUREG/CP—0049, pp A1-A8) **Post-irradiation behaviour of defected UO_2 fuel elements in air at 220 to 250°C.** Novak, J.; Hastings, I.J. (Ontario Hydro, Toronto; Atomic Energy of Canada Ltd., Chalk River, Ontario). Mar 1984. NTIS, PC A22/MF A01 - GPO* $9.50. Order Number TI84901063. (CONF-830897—).

From NRC workshop on spent fuel/cladding reactions during dry storage; Gaithersburg, MD, USA (17 Sep 1983).

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Irradiated CANDU UO_2 fuel elements with and without deliberately-induced defects were heated in air. The temperature range was 220 to 250°C for times up to 685 h. Pre-test burnup was about 190 MW.h/kg U (8000 MW.d/TeU) at a maximum linear power of 45 kW/m. Elements with single and multi-defects maintained reasonable dimensional stability up to 685 h at 220 and 230°C, consistent with fuel oxidation primarily to U_3O_7. In this temperature range, there was no significant difference in response of defected elements with different power histories and cooling times. Irradiated fuel showed rates of weight increases up to 50 times greater than those for unirradiated fuel. Elements with single and multi-defects showed significant diametral increases and severe sheath splitting after about 200 h at 250°C, consistent with fuel oxidation primarily to U_3O_8. 3 references, 12 figures, 1 table.

30306 (NUREG/CP—0049, pp B1-B6) **Behavior in air at 175 to 250°C of UO_2 fuel fragments extracted from irradiated elements.** Hastings, I.J.; Novak, J. (Atomic Energy of Canada Ltd., Chalk River, Ontario; Ontario Hydro, Toronto). Mar 1984. NTIS, PC A22/MF A01 - GPO* $9.50. Order Number TI84901063. (CONF-830897—).

From NRC workshop on spent fuel/cladding reactions during dry storage; Gaithersburg, MD, USA (17 Sep 1983).

UO_2 fuel fragments extracted from intact and defected irradiated CANDU elements were heated in air. The temperature range was 175 to 250°C for times in excess of 1200 h. Maximum pre-test burnups and linear powers were 190 MW.h/kg U (8000 MW.d/TeU) and 45 kW/m, respectively. Rates of weight gain varied from about 10^{-4} wt %/h to 2 x 10^{-2} wt %/h at 175 and 250°C respectively. All data are described by a process with an activation energy of about 130 kJ/mol. Irradiation and fragment size had significant effects on the rate of weight increase. The results have application to the station handling, transport and dry storage of irradiated nuclear fuel in the temperature range to 250°C. 6 references, 7 figures, 2 tables.

30307 (NUREG/CP—0049, pp D1-D7) **Uranium dioxide fuel oxidation in air below 350°C.** Simpson, K.A.; Wood, P. (CEGB, Berkeley Nuclear Labs., Gloucestershire, England). Mar 1984. NTIS, PC A22/MF A01 - GPO* $9.50. Order Number TI84901063. (CONF-830897—).

From NRC workshop on spent fuel/cladding reactions during dry storage; Gaithersburg, MD, USA (17 Sep 1983).

In a CEGB program of work on low temperature oxidation of UO_2, samples of unirradiated AGR fuel pellet are kept in air at 175 to 250°C in simple furnaces. A thermobalance is used for short-term tests and at higher temperatures. U_3O_8 production has been observed down to 200°C, after an induction period which increases with decreasing temperature. At 175°C no U_3O_8 powder has been produced within seven months. Tests on irradiated AGR pellet fragments at 12,400 MWd te^{-1} have shown that, at 250°C, a few days can pass before loose particulate is visible. During the induction period, a layer of U_3O_7 is considered to form on the UO_2 surface, followed by formation of U_3O_8 and disruption of the surface at a weight gain independent of temperature, but possibly dependent on specimen geometry, density and irradiation. The temperature dependence of the rate of production of U_3O_8 below 350°C has been established. 11 references, 4 figures, 1 table.

30308 (NUREG/CP—0049, pp G1-G14) **Oxidation rate of zirconium tubing in moist air between 250°C to 400°C.** Stokes, R.J.; Blankenship, L.A. Mar 1984. NTIS, PC A22/MF A01 - GPO* $9.50. Order Number TI84901063. (CONF-830897—).

From NRC workshop on spent fuel/cladding reactions during dry storage; Gaithersburg, MD, USA (17 Sep 1983).

Storage of spent nuclear fuel is a growing interest within the Tennessee Valley Authority. An alternative to pool storage is dry storage. To support licensing efforts it was determined that additional information on the oxidation rate of the zirconium fuel rod material was needed. A scheduled two-year project to obtain necessary long-term data was begun in October 1982. This paper presents weight gain (mg/dm^2) versus time (days) data for Zircaloy 2 and Zircaloy 4 tubing after exposure in moist air at 250°C, 300°C, 350°C, and 400°C. These data will be compared with data available in current publications. Optical microscopy showing general microstructures and scanning electron microscopy comparing oxidation morphology at various times and temperatures are included. 8 references, 10 figures.

30309 (NUREG/CP—0049, pp H1-H35) **Effect of known clad and pellet reactions on the GEC ESL design of dry vault store.** Wheeler, D. (GEC Energy Systems Ltd., Whetstone, England). Mar 1984. NTIS, PC A22/MF A01 - GPO* $9.50. Order Number TI84901063. (CONF-830897—).

From NRC workshop on spent fuel/cladding reactions during dry storage; Gaithersburg, MD, USA (17 Sep 1983).

The more important clad and pellet reactions and their temperature dependence are briefly reviewed, followed by an outline of the economical GEC ESL interim spent fuel storage concept that highlights: The ability of the concept to reduce the temperature of the fuel to values where the clad and pellet reactions are minimal. The containment philosophy that enables any consequences of the reactions to be safely retained to ALARA principles. The maintenance of an air storage environment that can never be lost. The utilisation of passive, naturally induced cooling regimes. The ability to continuously monitor for long-term degradation, together with ease of inspection at any time during storage.

30310 (NUREG/CP—0049, pp J1-J36) **Estimating the limiting temperature for dry storage with respect to stress corrosion cracking.** Miller, A.K.; Tasooji, A. (Stanford Univ., CA). Mar 1984. NTIS, PC A22/MF A01 - GPO* $9.50. Order Number TI84901063. (CONF-830897—).

From NRC workshop on spent fuel/cladding reactions during dry storage; Gaithersburg, MD, USA (17 Sep 1983).

Spent fuel cladding under dry storage conditions will be held under a tensile hoop stress for a long time, is irradiated hardened, may contain a distribution of incipient cracks from in-reactor service, may be in an aggressive fission product environment, and is at elevated temperatures (perhaps 200°C to 400°C). In trying to predict the possible occurrence of stress corrosion cracking for these conditions, one can consider two approaches: A model centered approach; for example the SCCIG model which covers the desired conditions in a unified physical-phenomenological manner. However a key input to the model, namely the chemical state inside spent fuel cladding, can only be very roughly estimated at present. Using conservative assumptions on this variable, it is estimated that for low-probability worst case conditions (50% fission gas release in a pre-pressurized PWR rod) the SCC limiting temper-

ature is 150°C; for typical case conditions it is greater than 400°C. A data-centered approach; for example extrapolation, using fracture mechanics, from 2000 hour test results on split ring specimens in specific environments to 100 year storage times. This paper argues that such an extrapolation might be acceptable if the cladding temperature is below some upper limit (presently estimated at 290°C) but that above this limit the relevant incipient crack sizes must be too small (less than 10% of the wall thickness) for fracture mechanics to be appropriate.

30311 **The behavior of a B_4C-phenolic and a glass-fiber-reinforced B_4C-phenolic composite in a spent nuclear fuel storage pool.** Macmillan, N.H.; Dooher, G.I.; Naum, R.G. (The Pennsylvania State University Materials Research Laboratory, University Park, Pennsylvania 16802). *Nuclear Technology;* **59**: No. 2, 327-343(Nov 1982).

A three-part experimental study has been carried out to determine the effects of exposure to the spent nuclear fuel pool environment on two composite neutron-absorbing materials–one made in plate form and consisting of about 72 wt% of B_4C particles bonded together by about 28 wt% of a phenol-formaldehyde polymer, and the other made in sheet form and consisting of about 62 wt% of B_4C particles bonded to both sides of a woven glass-fiber reinforcement by about 19 wt% of the same polymer. The results of the mechanical and physical properties tests show that the two materials degrade somewhat differently in the spent fuel pool environment. In the case of the plate material, radiation-induced expansion and embrittlement of the polymer lead at doses about 10^9 Gy to about 1% linear expansion, with a concomitant about 60% reduction in strength and stiffness and a somewhat enhanced sus-

0510 Marketing And Economics

REFER ALSO TO CITATION(S) 30300

0520 Waste Management

REFER ALSO TO CITATION(S) 30385, 30386, 30387, 30388, 30391, 30396, 30833, 30835, 30837, 30838, 30840, 30841, 30842, 30863, 31266, 31824, 31825, 31826, 31827, 31843, 31858

30312 **(BMI/ONWI—503) First status report on regional ground-water flow modeling for the Paradox Basin, Utah.** Andrews, R.W. (INTERA Environmental Consultants, Lakewood, CO (USA)). May 1984. Contract AC02-83CH10140. 185p. NTIS, PC A09/MF A01; GPO Dep. Order Number DE84012679.

Regional ground-water flow within the principal hydrogeologic units of the Paradox Basin is evaluated by developing a conceptual model of the flow regime in the shallow aquifers and the deep-basin brine aquifers and testing these models using a three-dimensional, finite-difference flow code. Semiquantitative sensitivity analysis (a limited parametric study) is conducted to define the system response to changes in hydrologic properties or boundary conditions. A direct method for sensitivity analysis using an adjoint form of the flow equation is applied to the conceptualized flow regime in the Leadville limestone aquifer. All steps leading to the final results and conclusions are incorporated in this report. The available data utilized in this study is summarized. The specific conceptual models, defining the areal and vertical averaging of lithologic units, aquifer properties, fluid properties, and hydrologic boundary conditions, are described in detail. Two models were evaluated in this study: a regional model encompassing the hydrogeologic units above and below the Paradox Formation/Hermosa Group and a refined scale model which incorporated only the post Paradox strata. The results are delineated by the simulated potentiometric surfaces and tables summarizing areal and vertical boundary fluxes, Darcy velocities at specific points, and ground-water travel paths. Results from the adjoint sensitivity analysis include importance functions and sensitivity coefficients, using heads or the average Darcy velocities to represent system response. The reported work is the first stage of an ongoing evaluation of the Gibson Dome area within the Paradox Basin as a potential repository for high-level radioactive wastes.

30313 **(BMI/SRP—5006) Well completion report - Sawyer No. 1 (PD-3) well, Palo Duro Basin, Texas: unanalyzed data.** (Stone and Webster Engineering Corp., Boston, MA (USA)). May 1984. Contract AC06-76RL01830;AC02-83CH10140. 362p. NTIS, PC E13/MF $7.00; 1; GPO Dep. Order Number DE84012672.

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The drilling and testing of Sawyer No. 1 well, located in Southeastern Donley County about 5 miles north of Clarendon, Texas, are described. Drilling and testing were performed by Stone and Webster Engineering Corporation as a part of a nationwide program to identify potential locations for a nuclear waste repository. This report describes the drilling and testing activities actually performed (compared to the Field Test Plan), describes the problems encountered, and provides recommendations for future work. Data gathered during drilling and testing of the well are included as appendices to this report. Drilling of the well began June 23, 1981. Casing was installed and cemented to a total depth of 5180 feet on October 14, 1981. These data are preliminary. They have been neither analyzed nor evaluated.

30314 **(BMI/SRP—5008) Well completion report - Detten No. 1 (PD-6) well, Palo Duro Basin, Texas: unanalyzed data.** (Stone and Webster Engineering Corp., Boston, MA (USA)). May 1984. Contract AC06-76RL01830;AC02-83CH10140. 263p. NTIS, PC A12/MF A01; 1; GPO Dep. Order Number DE84012673.

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The drilling and testing of Detten No. 1 well, located in Deaf Smith County, about 8 miles north of Hereford, Texas, are described. Drilling and testing were performed by Stone and Webster Engineering Corporation as a part of a nationwide program to identify potential locations for a nuclear waste repository. This report describes the drilling and testing activities actually performed (compared to the Field Test Plan), describes the problems encountered, and provides recommendations for future work. Data gathered during drilling and testing of the well are included as appendices to this report. Drilling of the well began February 26, 1982. The drilling and testing activities terminated at a total depth of 2839 feet and were completed on May 5, 1982. These data are preliminary. They have been neither analyzed nor evaluated.

30315 **(BMI/SRP—5009) Well completion report - Zeeck No. 1 (PD-7) well, Palo Duro Basin, Texas: unanalyzed data.** (Stone and Webster Engineering Corp., Boston, MA (USA)). May 1984. Contract AC06-76RL01830;AC02-83CH10140. 453p. NTIS, PC A20/MF A01; 1; GPO Dep. Order Number DE84012710.

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The drilling and testing of Zeeck No. 1 well, located in central Swisher County, about 4 miles east of Tulia, Texas, are described. Drilling and testing were performed by Stone and Webster Engineering Corporation as a part of a nationwide program to identify potential locations for a nuclear waste repository. This report describes the drilling and testing activities actually performed (compared to the Field Test Plan), describes the problems encountered, and provides recommendations for future work. Data gathered during drilling and testing of the well are included as appendices to this report. Drilling and testing of the well were completed in 125 days from the spud date on April 9, 1982, to demobilization on August 12, 1982. These data are preliminary. They have been neither analyzed nor evaluated.

30316 **(BMI/SRP—5010) Pumping test and fluid sampling report - Sawyer No. 1 well, Palo Duro Basin, Texas: unanalyzed data.** (Stone and Webster Engineering Corp., Boston, MA (USA)). May 1984. Contract AC02-83CH10140;AC06-76RL01830. 291p. NTIS, PC A13/MF A01; 1; GPO Dep. Order Number DE84012671.

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This report describes pumping test and fluid sampling activities performed at the Sawyer No. 1 well, Donley County, Texas. Sawyer No. 1 well is located along the eastern margin of the Palo Duro Basin in an area of active dissolution within the Permian salt section. These data were collected by Stone and Webster Engineer-

ing Corporation working in conjunction with the Texas Bureau of Economic Geology as part of a nationwide program to identify potential locations for a nuclear waste repository. These data support studies to determine the hydrologic characteristics of deep water-bearing formations. Formation fluid studies samples were analyzed in order to evaluate fluid migration and age relationships in the Permian Basin. These data were collected from June until October, 1981. Zone isolation for pump testing was accomplished in November, 1981. These data are preliminary. They have been neither analyzed nor evaluated.

30317 **(CNEN-NE—1.09) Standard model for safety analysis report of fuel fabrication plants.** (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). Sep 1980. 150p. (In Portuguese). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84701854.

A standard model for a safety analysis report of fuel fabrication plants is established. This model shows the presentation format, the origin, and the details of the minimal information required by CNEN (Comissao Nacional de Energia Nuclear) aiming to evaluate the requests of construction permits and operation licenses made according to the legislation in force.

30318 **(CNEN-NE—1.10) Safety of systems for the retention of wastes containing radionuclides.** (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). Nov 1980. 22p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701898.

Information and minimal requirements demanded by CNEN for the emission of the Approval Certificate of the Safety Analysis Report related to system for the retention of wastes containing radionuclide, are established, aiming to assure low radioactivity levels to the environment.

30319 **(CONF-831217—) Proceedings of the 1983 civilian radioactive waste management information meeting.** (USDOE Office of Civilian Radioactive Waste Management, Washington, DC). Feb 1984. 427p. NTIS, PC A19/MF A01; 1; GPO Dep. Order Number DE84009395.

From 5. civilian radioactive waste management information meeting; Washington, DC, USA (12 Dec 1983).

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This proceedings document from the 1983 Civilian Radioactive Waste Management Information Meeting serves to highlight developments since the passage of the Nuclear Policy Act of 1982 and reviews program activities necessary to provide for the permanent disposal and storage of commercially generated high-level radioactive waste. Presentations included in this program cover topics concerning interim spent fuel, monitored retrievable storage, geologic repository deployment as well as management of the Nuclear Waste Fund. Individual papers were abstracted for inclusion in the Energy Data Base.

30320 **(DOE/EV—0005/37) Formerly utilized MED/AEC sites remedial action program. Radiological survey of the former Watertown arsenal property, Site 34 and Site 41, Watertown, Massachusetts.** Wynveen, R.A.; Smith, W.H.; Sholeen, C.M.; Justus, A.L.; Flynn, K.F. (Argonne National Lab., IL (USA)). Oct 1983. Contract W-31-109-ENG-38. 81p. (ANL-OHS/HP—83-106). NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84011431.

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During the MED/AEC era, work involving radioactive materials was conducted at various sites within the arsenal complex. Building 34 housed a uranium machine shop, and a portion of Building 41 contained a foundry that was used for uranium work. Information provided by site personnel indicated that only depleted uranium was used in these buildings. Results of radiological analyses of contaminated material found at these sites indicated depleted uranium with uranium-236. Both buildings have been razed. The remnants still in place consist of the concrete floor slabs, access drives, and underground utility service trenches. This area is currently under the control of the Watertown Redevelopment Authority of Watertown, Massachusetts. During the period from June 25 through July 1, 1981, the Argonne National Laboratory (ANL), Occupational Health and Safety Division (OHS) Radiological Survey Group (RSG), conducted a radiological survey of Building Sites 34 and 41 at the direction of the US Department of Energy. Significant levels of contamination were found at 33 locations on the pad of Site 34 and in 5 out of 15 soild corings from the perimeter of the pad. No contamination was found on the pad of Site 41; however, two-thirds of this pad was covered with soil up to 4 ft thick. One of the 14 soil corings taken adjacent to the pad of Site 41 had elevated levels of uranium. Levels of contamination in excess of criteria, as identified in ANSI 13.12 and NRC Guidelines, were found at this site. The analyses of the samples from the sewer access points also revealed uranium and radium-226 anomalies. Therefore, according to NRC guidelines dated July 1982, it must be concluded that they are contaminated.

30321 **(DOE/EV—0005/38) Formerly utilized MED/AEC sites Remedial Action Program. Radiological survey of the former Watertown Arsenal property GSA site Watertown, Massachusetts.** Wynveen, R.A.; Smith, W.H.; Sholeen, C.M.; Justus, A.L.; Flynn, K.F. (Argonne National Lab., IL (USA)). Oct 1983. Contract W-31-109-ENG-38. 110p. (ANL-OHS/HP—83-108). NTIS, PC A06/MF A01; GPO Dep. Order Number DE84011798.

The complete radiological survey of all the buildings located on the GSA site revealed no contamination. However, significant contamination was found on the site grounds. A total of approximately 6 m^2 of surface area exhibited elevated radiation levels. The area of contamination is centered around Section I (the burn area) and spreads out from this point. The contamination includes the subsurface, descending to the water table at the 6-ft level in some places. The contamination is primarily reprocessed depleted uranium. The ambient radiation level in the vicinity of the contamination as measured with a pressurized ionization chamber is significantly above background levels (up to 18 μR/h). As expected, no significant levels of radon contamination were found in any of the air samples. These levels of contamination of exceed the criteria as defined in ANSI 13.12 and the NRC Guidelines. The ambient radiation levels (up to 18 μR/h) are not in excess of criteria as defined in Appendix 6.

30322 **(DOE/IG—0207) Potential for cost reduction in the Waste Isolation Pilot Plant (WIPP) project.** (USDOE Office of Inspector General, Washington, DC). 18 Jun 1984. 76p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012496.

Portions are illegible in microfiche products. Original copy available until stock is exhausted; Report to The Secretary.

During the First Quarter of Fiscal Year 1984, a review of the Waste Isolation Pilot Plant (WIPP) project managed by the Assistant Secretary for Defense Programs was conducted. Although a commendable effort to reduce project costs had been initiated by program officials in December 1981, additional cost reduction opportunities were found. For example, it was found that the research and development program had not received the same degree of scrutiny during cost reduction activities as had the area of capital costs, and several experiments were identified that could be reduced in scope or eliminated. Although cost reduction opportunities were not identified during the review of land and siting issues, it was found that the Department may be vulnerable to additional costs amounting to millions of dollars. More importantly, it was found that capital costs of the project could be further reduced by decreasing the size and shielding of the hot cell facility, or by eliminating it completely, and by adopting a less costly, but adequate, alternative for dining area/visitor center facilities. Although it is difficult to quantify the cost savings associated with these cost reduction opportunities, the estimate of possible savings is tens of millions of dollars.

30323 **(DOE/UMT—0217) Revegetation and rock cover for stabilization of inactive uranium mill tailings disposal sites. Final report.** Beedlow, P.A. (Pacific Northwest Lab., Richland, WA (USA)). May 1984. Contract AC06-76RL01830. 85p. (PNL—5105). NTIS, PC A05/MF A01; GPO Dep. Order Number DE84013323.

Guidelines for using vegetation and rock to protect inactive uranium mill tailings from erosion were developed by Pacific Northwest Laboratory as part of the Department of Energy's Uranium Mill Tailings Remedial Action Project (UMTRAP) Technology Development program. Information on soils, climate, and vegetation were collected for 20 inactive tailings sites in the western United States. Sites were grouped according to similarities in climate and vegetation. Soil loss for those sites was characterized using the Universal Soil Loss Equation. Test plots were used to evaluate (1) the interaction between vegetation and sealant barrier systems and (2) the effects of surface rock on soil water and vegetation. Lysimeter and simulation studies were used to direct and support field experiments. 49 references, 17 figures, 16 tables.

30324 **(DPST—82-472) Jet impact force studies.** Wiggins, A.W. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). 5 May 1982. Contract AC09-76SR00001. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012422.

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In sludge procesing and waste removal operations, settled sludge is resuspended using turbulent jets from centrifugal slurry pumps. The effects of these turbulent jets on cooling coil structures in waste tanks have been examined to determine if the use of slurry pumps will lead to damage of the coils or their bottom supports. Force equations and direct force measurements were used to examine three slurry pumps and three tank cooling coil structures. The three pumps were: the Bingham-Willamette Company (BWC) pump; the Quad Volute pump; and the single nozzle pump. The three cooling coil structures were: The Type III tank design with angle iron bottom supports (yield stress - 36,000 psi), the Type I and II tank design with steel rod guides as bottom support (yield stress - 24,000 psi), and the cooling coil bundles found in some Type III tanks such as tanks 32 and 35 (yield stress - 36,000 psi).

30325 **(EGG-M—19183) Waste Experimental Reduction Facility: description and progress report.** Logan, J.A.; Larsen, M.M.; Maughan, R.Y. (EG and G Idaho, Inc., Idaho Falls (USA)). 15 Mar 1984. Contract AC07-76ID01570. 7p. (CONF-840307—43). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012279.

From Waste management '84; Tucson, AZ, USA (11 Mar 1984).

This paper traces the establishment of and describes the current characteristics of the Waste Experimental Reduction Facility, now processing low-level beta/gamma contaminated waste at the Idaho National Engineering Laboratory. It outlines principal findings and facility and procedural changes that occurred during the facility startup period (September 1982 to July 1983) while sizing (cutting) and melting uncontaminated metal in preparation for processing contaminated metal, which commenced in July 1983. It also describes processing experiences thus far with contaminated metal. 4 figures

30326 **(EGG-WM—6627) Data base management system of the National Low-Level Radioactive Waste Management Program.** Carpenter, L.D.; Aquilina, C.A.; Jordon, B.A. (EG and G Idaho, Inc., Idaho Falls (USA)). Jun 1984. Contract AC07-76ID01570. 15p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012789.

This report describes the National Low-Level Radioactive Waste Management Program's Data Base Management System. This system developed by EG and G Idaho, Inc., provides standardized data specification and reporting formats. Data on reactor and nonreactor waste, current and projected disposal volumes, and governing laws and regulations can be requested at national, regional, and state levels, yielding information that is of immediate benefit for decision-making. The report describes the various integrated data bases and models currently available for various uses.

30327 (EPRI-NP—3222, pp 1-3) **Liquid waste treatment.** Etheridge, J. Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

Four areas of liquid waste treatment are covered: evaporation, demineralization, filtration, and processing of oil. Several methods are discussed to improve evaporator operation. In regard to demineralization versus evaporation, it is generally considered that demineralization is the preferred alternative to evaporation. Demineralizer regeneration versus disposal of the resin is also discussed. In the area of filtration, three types of filters are discussed: cartridge-type filters, pre-coat filters, and backflushable filters. At the present time, there are not many methods of processing oil. In summary, treatment of liquid radwaste is very site-specific. What proves to be cost effective for one plant may not necessarily be true for another. Therefore, each plant should review and evaluate its present methods of liquid radwaste treatment and pursue alternative methods that will yield the biggest payback.

30328 (EPRI-NP—3222, pp 12-21) **Summary of EPRI's low-level radioactive waste program.** Naughton, M. (Electric Power Research Inst., Palo Alto, CA). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

EPRI studies in the areas of waste segregation, volume reduction, monitoring of the activity in process streams, solidification of the product, product storage, and radiation exposure are discussed. 6 figures.

30329 (EPRI-NP—3222, pp 39-43) **Management of oil in radwaste systems.** Coplan, B.V. (BVC Consultants, Inc., Sun City Center, FL). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The results from a survey of utilities of how they collect and dispose of radioactively contaminated oil in radwaste are presented.

30330 (EPRI-NP—3222, pp 44-57) **Part 61 licensing requirement for land disposal of radioactive waste.** Naughton, M.; Miller, A. (EPRI, Palo Alto, CA; EDS Nuclear, Inc., Norcross, GA). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The requirements of 10CFR61 for waste classification are discussed.

30331 (EPRI-NP—3222, pp 77-85) **Sectioning of contaminated materials and electrochemical decontamination.** Budke, W.C. Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

Large amounts of surface contaminated metal waste is generated annually by operating utilities and by the decommissioning of obsolete facilities. This waste, especially that contaminated with transuranic elements, creates a problem of transportation, storage, and ultimately geological disposal. Ongoing work at Allied Consulting demonstrates that electropolishing techniques can be an effective tool in removing transuranic and other radio-nuclide contamination from metallic surfaces. Work includes the sectioning and processing of PWR spent fuel racks in preparation for decontamination by electropolishing. Several sectioning techniques are employed with varying degrees of success, including plasma arc torch and mechanical saws. Plasma arc torch is a very rapid and effective metal cutting tool on size reduction and sectioning applications. However, its use to prepare materials for decontamination is minimized because of problems with smoke generation, torch manipulation, waste generation and entrainment of contaminants. Mechanical saws eliminate most of these problems but the waste generation, although they are not very maneuverable. Our work to date demonstrates that with certain requirements, contaminated components can be sectioned safely, efficiently, and with minimal waste generation into sizes needed for subsequent decontamination by electropo-

lishing. Requirements include proper design of the sectioning facility, flexibility in its mode of operation, and the use of appropriate combination of available industrial metal cutting techniques.

30332 (EPRI-NP—3222, pp 88-91) **Soil decontamination.** Levesque, R. (Bechtel National, Inc., Oak Ridge, TN). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

This presentation discusses the approaches used by Bechtel National, Inc. (BNI) to decontaminate and/or stabilize contaminated site under the Formerly Utilized MED/AEC Sites Remedial Action Program (FUSRAP).

30333 **(GAO/RCED—84-111) DOE needs to evaluate fully the waste management effects of extending the useful life of nuclear fuel.** Peach, J.D. (General Accounting Office, Washington, DC (USA). Resources, Community and Economic Development Div.). 27 Jan 1984. 10p. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20760. Order Number TI84901109.

The potential impact of extended nuclear fuel burnup on DOE's program for accepting commercial spent fuel under the Nuclear Waste Policy Act was evaluated. Existing studies by DOE and independent analysts were reviewed as well as DOE program documents, congressional hearing records, and representatives of DOE, Nuclear Regulatory Commission, the five principal US nuclear fuel manufacturer, utilities, and nuclear industry organizations. Recommendations were that: DOE should consider the merits of continued government funding of the DOE extended fuel burnup program in terms of the potential budgetary costs, the potential benefits and beneficiaries, and the likelihood that the nuclear industry would continue extending fuel burnup and should quantify the effect of increases in fuel burnup on its spent fuel acceptance schedule, and clearly identify the potential impact on its requirements for providing the necessary facilities and services to carry out the Nuclear Waste Policy Act.

30334 **(IAEA-R—2575-F) Bituminous solidification, disposal, transport and burial of spent ion-exchange resins. Part of a coordinated programme on treatment of spent ion exchange resins. Final report for the period 1 June 1980 - 30 June 1983.** Mozes, G.; Kristof, M. (International Atomic Energy Agency, Vienna (Austria)). Jul 1983. 72p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701899.

The project dealing with the incorporation of spent ion-exchange resins into bitumen was performed within the Agency coordinated research programme on treatment of spent ion-exchange resins. Physical and chemical properties of commercial ion-exchange resins, bitumens and bituminized resins were studied. It was shown that bitumen with low oil content and with a softening point of 60-70°C are applicable for the incorporation of resins. The final waste form is allowed to contain maximum 50% resin. The comprehensive study of the biological resistance of B-30 bitumen was performed. That study showed that any bacteriological attack can be regarded as generally insignificant. A continuously operating technology was realized on a semi-plant scale. The best operating conditions of this technology were determined. On the basis of the experience gained from the experiments a design of the bituminization plant of 50m^3 dry resin/year treatment capacity was proposed.

30335 (INIS-mf—8937, pp 412-421) **Waste package.** Jensen, P. (ELKRAFT, Ballerup, Denmark). Sep 1982. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780262. (CONF-8111198—Pt.2).

From Symposium on geological investigations for high-level waste disposal in the Mors Salt Dome; Copenhagen, Denmark (18 Nov 1981).

Canisters containing vitrified high-level waste are to be deposited in salt domes at Mors. Canisters are encapsulated in steel casks so they are shielded for any mechanical impacts. Heat generation by radioactive waste does not affect the vitrified material, as maximum temperatures are about 180°C. The necessary depth of repository is considered.

30336 (INIS-mf—8937, pp 422-441) **Vitrified high-level waste.** Brodersen, K. (Forsoegsanlaeg Risoe, Roskilde, Denmark). Sep 1982. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780262. (CONF-8111198—Pt.2).

From Symposium on geological investigations for high-level waste disposal in the Mors Salt Dome; Copenhagen, Denmark (18 Nov 1981).

The material properties of solidified high-level waste constitute the inmost barrier against release of activity from the waste to the surrounding geological environment. A short introduction to production and properties of high-level waste will be given with main emphasis on vitrified high-level waste. The presentation is based on a review report prepared for the Danish utilities in 1980. The deep hole concept developed by the utilities is well suited for disposal of solidified high-level waste from a relatively minor nucler power reactor programme. This is due to the small volume of waste which makes the system feasible and the high specific radio-toxicity of the material which motivates the economic expenses. Some comments on the decrease in radio-toxicity of the material with time are given.

30337 (INIS-mf—8937, pp 442-469) **Waste disposal concepts.** Haddenhorst, H.-G. (Kavernen Bau- und Betriebs GmbH). Sep 1982. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780262. (CONF-8111198—Pt.2).

From Symposium on geological investigations for high-level waste disposal in the Mors Salt Dome; Copenhagen, Denmark (18 Nov 1981).

The final disposal of radwaste material in salt either in conventionally mined galleries, deep holes or in solution mined salt caverns is among the disposal concepts the safest and most suitable system. The remaining risk that radioactive particles will enter into our biosphere during a period of 100,000 or probably a million years or more is highly remote and compared to the other risks in our human life practivaly zero.

30338 (INIS-mf—8937, pp 469-480) **Why the deep hole concept.** Jensen, P. (ELKRAFT, Ballerup, Denmark). Sep 1982. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780262. (CONF-8111198—Pt.2).

From Symposium on geological investigations for high-level waste disposal in the Mors Salt Dome; Copenhagen, Denmark (18 Nov 1981).

The deep hole solution is well suited for a small waste programme such as the one we are dealing with in Denmark. Deep holes have been drilled at several places around the world. The curve illustrates the present capability of big hole drilling. Examples of actually drilled holes are also indicated, as well as the deep disposal holes which we envisage at Mors. Our disposal holes are well below present capability.

30339 (INIS-mf—8937, pp 481-492) **Temperature field.** Neltrup, H. (Forsoegsanlaeg Risoe, Roskilde, Denmark). Sep 1982. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780262. (CONF-8111198—Pt.2).

From Symposium on geological investigations for high-level waste disposal in the Mors Salt Dome; Copenhagen, Denmark (18 Nov 1981).

The modest temperature in the salt, which is a consequence of the moderate heat load characteristic for the chosen concept of the repository, indicates that even very complicated structures, which may be present in the salt dome, will not to significant degree affect the local environment of the waste canisters.

30340 (INIS-mf—8937, pp 503-518) **Interaction between waste and salt.** Pedersen, A. (ELSAM, Fredericia, Denmark). Sep 1982. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780262. (CONF-8111198—Pt.2).

From Symposium on geological investigations for high-level waste disposal in the Mors Salt Dome; Copenhagen, Denmark (18 Nov 1981).

The evaluations allow the conclusion to be made that the interaction between waste and salt will give no difficulties. The dome has reached a mature state, the salt in the proposed disposal area around the E2 drilling contains no sensitive minerals and the

waste form used with steel containers and low heat production gives a considerable margin against uncertainties.

30341 (INIS-mf—8961, pp 148-160) **Problems of preparation of high-level radioactive wastes for disposal.** Kulichenko, V.V.; Krylova, N.V.; Malashek, Eh. 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

In the paper review has been given of the works on preparation of high-level radioactive wastes for burial. Short description is given of the apparatus-technological layouts which have been developed in different countries. Special attention has been paid to the works which are conducted in the USSR and Czechoslovakia on the development of installations for vitrification of the high-level radioactive wastes and producing phosphate and borosilicate glasses. Results of the works are given on investigation of properties of the solidificated wastes. First of all, properties are considered which determine the burial conditions: thermal, radiation and water stabilities of the vitrificated wastes. Dependence has been studied of properties of wastes from their composition, specific activity and temperature of storage. Influence has been shown of removal of strontium and cesium radioisotopes on the conditions of storage of the vitrificated wastes. On the base of the data dealing with the properties and their changes in the course of storage, conditions have been shown for temporary storage and burial of the solidificated radioactive wastes.

30342 (INIS-mf—8961, pp 162-168) **Problems of solidificated radioactive wastes burial into deep geological structures.** Kedrovskij, O.L.; Leonov, E.A.; Romadin, N.M.; Shishcits, I.Yu. 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

Perspectives are noted of the radioactive wastes burial into deep geological structures. For these purposes it has been proposed to investigate several types of rocks, which do not have intensive gas-generation when being heated; salt deposits and clays. Based on the results of calculations it has been shown that the dimensions of zones of substantial deformations in the case of the high-level radioactive wastes burial do not exceed several hundreds of meters. Conclusion is made that in the case of choosing the proper geological structure for burial and in the case of inclusion in the structure of the burial site a zone of sanitary alienation, it is possible to isolate wastes safely for all the period of preservation. Preliminary demands have been formulated to geological structures and underground burial sites. As main tasks for optimization of burial sites considered are: determination of necessary types, number and reliability of barriers which ensure isolation of wastes; to make prognoses of the stressed and deformed state of a geological massif on the influence of thermal field; investigation in changes of chemical and physical properties of rocks under heat, radiative and chemical influence; estimation of possible diffusion of radioactivity in a mountain massif; development of a rational mining-technological schemes of the burial of wastes of different types. A row of tasks in the frameworks of this problem are solved successfully. Some results are given of the theoretical investigations in determination of zones of destructions of rocks because of heat-load.

30343 **(LA-UR—84-1647) Application of an agricultural water balance and erosion model in environmental science: a user perspective.** Hakonson, T.E.; Foster, G.R.; Lane, L.J.; Nyhan, J.W. (Los Alamos National Lab., NM (USA); Agricultural Research Service, West Lafayette, IN (USA)). 1984. Contract W-7405-ENG-36. 16p. (CONF-8406130—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012454.

From Symposium on prediction of agricultural non-point source pollution: model selection and application; Venice, Italy (11 Jun 1984).

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Studies have shown that the hydrologic erosion of soil is a major factor in the translational movement of environmental plutonium deposited on the ground surface and, as a consequence of rain splash of soil, also greatly influences transport of plutonium to plants including vegetable crops. This paper discusses the use of CREAMS (Chemicals, Runoff, and Erosion from Agricultural Management Systems), in developing environmental research programs at Los Alamos and in designing and monitoring the performance of shallow land burial (SLB) sites for low-level radioactive waste (LLW). Discussion is also presented on research needs and ongoing studies involving Los Alamos to supply some of those needs. 37 references, 7 figures, 3 tables.

30344 **(MRP/MSL—81-17(TR)) Assessment of the microbial populations in field and test pit experiments at Elliot Lake, Ontario, Canada.** Silver, M.; Taylor, J.B. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Jan 1981. 33p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701852.

Enumeration of aerobic and anaerobic heterotrophic (organic carbon-using) bacteria shows the establishment of a microbial population on vegetated tailings. The development of a population of heterotrophic bacteria, 90% of which are obligate aerobes, in the top 5 cm of the tailings is indicative of normal soil formation. The cell concentration decrease is greater than that found in older, well-developed soils. Iron-oxidizing thiobacilli are rarely present in the revegetated tailings, and then only at depths below 40 cm and at cell concentrations less than 100 cells/g. On an adjacent unvegetated portion of the tailings, fewer heterotrophic bacteria are found in the top 5 cm of the tailings. Iron-oxidizing thiobacilli are present uniformly in the top 47 cm. Enumeration of iron-oxidizing bacteria in the effluents of four test pit experiments indicate blockage of the drainage tiles in two experiments. Chemical conditions of the effluents are suitable for the formation of basic ferric precipitates that could cause this blockage.

30345 **(NUREG/CP—0052) NRC nuclear waste geochemistry 1983.** Alexander, D.H.; Birchard, G.F. (eds.). (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). May 1984. 541p. (CONF-8308126—). NTIS, PC A23/MF A01 - GPO* $10.00. Order Number DE84901252.

From NRC research annual review meeting of nuclear waste management research on geochemistry of HLW disposal; Reston, VA, USA (30 Aug 1983).

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The purpose of the meeting was to present results from NRC-sponsored research and to identify regulatory research issues which need to be addressed prior to licensing a high-level waste repository. Important summaries of technical issues and recommendations are included with each paper. The issue reflect areas of technical uncertainty addressed by the NRC Research program in geochemistry. The objectives of the NRC Research Program in geochemistry are to provide a technical basis for waste management rulemaking, to provide the NRC Waste Management Licensing Office with information that can be used to support sound licensing decisions, and to identify investigations that need to be conducted by DOE to support a license application. Individual papers were processed for inclusion in the Energy Data Base.

30346 **(NUREG/CR—3496) Review of a test program for qualifying the solidification of Epicor-II resins with cement.** Barletta, R.E.; Davis, R.E. (Brookhaven National Lab., Upton, NY (USA)). Jan 1984. Contract AC02-76CH00016. 28p. (BNL-NUREG—51712). NTIS, PC A03/MF A01 - GPO $3.75; GPO Dep. Order Number DE84007680.

The results and recommendations of the resin solidification test program conducted by Metropolitan Edison Company are reviewed. The original purpose of this program was to recommend a formulation or range of formulations suitable for the cement solidification of first-stage Epicor-II liners generated during cleanup activities at Three Mile Island. This was to be accomplished through a systematic laboratory and full-scale testing program using ion-exchange materials supplied by Epicor, Incorporated. Events, however, caused the truncation of the full-scale testing. Hence, a formulation was recommended based upon the results of laboratory scale

testing. Failure to achieve satisfactory solidification in a single full-scale test using this formulation was observed. The unqualified conclusion that these tests demonstrate that the Epicor-II spent ion exchange media can be successfully solidified in cement appears to be unwarranted. Through a full-scale testing program, some of the deficiencies of the full-scale waste form may be resolved by simple technical modification or implementation of a process control program. Met-Ed/GPU had recognized the need for additional full-scale testing. Further, conflicting results of the screening and primary phases of the Met-Ed/GPU test program and the general conclusion of the Met-Ed/GPU study are noted in this report.

30347 **(NVO—196-24-Rev.4) Bibliography of the published reports, papers and articles on the Nevada Nuclear Waste Storage Investigations. Revision 4.** (USDOE Nevada Operations Office, Las Vegas). May 1984. 101p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84013381.

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This document is a bibliography of the published reports, papers, and articles on the Nevada Nuclear Waste Storage Investigations (NNWSI). A brief history is included to familiarize the reader with the general direction and activity highlights of the NNWSI and to give the reader some insight into the kinds of bibliographic references to be found in this document. The bibliography is categorized by principal NNWSI participant organizations. Participant-sponsored subcontractor reports, papers, and articles are included in the sponsoring organization's bibliography list. The principal participant bibliography listings are arranged in chronological order by title. An author index is provided after the bibliography.

30348 **(OH—82-144-K) Electrodialytic decontamination of spent ion exchange resins.** Nott, B.R. (Ontario Hydro Research Lab., Toronto (Canada)). 20 Sep 1982. 29p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701858.

Development of a novel electrodialytic decontamination process for the selective removal of radioactive Cs from spent ion exchange resins containing large amounts of Li is described. The process involves passage of a dc electric current through a bed of the spent ion exchange resin in a specially designed electrodialytic cell. The radiocesium so removed from a volume of the spent resin is concentrated onto a much smaller volume of a Cs selective sorbent to achieve a significant radioactive waste volume reduction. Technical feasibility of the electrodialytic resin decontamination process has been demonstrated on a bench scale with a batch of simulated spent ion exchange resin and using potassium cobalt ferrocyanide as the Cs selective sorbent. A volume reduction factor between 10 and 17 has been estimated. The process appears to be economically attractive. Improvements in process economics can be expected from optimization of the process. Other possible applications of the EDRD process have been identified.

30349 **(PB—84-145762) Survey of the marine benthic infauna collected from the United States radioactive waste disposal sites off the Farallon Islands, California. Final report.** Reish, D.J. (California State Univ., Long Beach (USA). Dept. of Biology). Jan 1983. 65p. NTIS, PC A04/MF A01.

Benthic biological samples were taken in 1977 from the vicinity of the Farallon Islands radioactive waste disposal sites for characterization of the infaunal macroinvertebrates and foraminifera. A total of 120 invertebrate species were collected, of which 75 species (63 percent) were polychaetes. Forty-three of these polychaete species have not previously been reported from depths greater than 1000m. A total of 1044 macroinvertebrate specimens were collected of which 54 percent were polychates. Only the nematods were present at all six benthic stations, but the community structure was dominated by the polychaetes Tauberia gracilis, Allia pulchra, Chaetozone setosa, and Cossura candida. Living and dead foraminifera were reported. The possible role of polychaetes in bioturbation and in the marine food chain is briefly discussed with respect to the various polychaete feeding mechanisms.

30350 **(PNL—5108) Adequacy of radioiodine control and monitoring at nuclear fuels reprocessing plants.** Scheele, R.D.; Burger, L.L.; Soldat, J.K. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1984. Contract AC06-76RL01830. 38p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84013311.

The present backlog of irradiated reactor fuel leads to projections that no fuel out of the reactor less than 10 years need be reprocessed prior to the year 2000. The only radioiodine present in such aged fuel is ^{129}I (half-life 1.6×10^7 y). The ^{131}I initially present in the fuel decays to insignificance in the first few hundred days post-reactor. The ^{129}I content of irradiated fuel is about 1 Ci per gigawatt-year of electricity generated (Ci/GW(e)-y). The US EPA has specified, in 40 CFR 190, a release limit for ^{129}I of 5 mCi/GW(e)-y. Thus a retention factor (RF) of 200 for ^{129}I at the fuel reprocessing plant (FRP) is required. Experience indicates that RF values obtained under actual FRP operating conditions can average as little as 10% of experimentally determined RF values. Therefore processes theoretically capable of achieving RF values of up to 10^4 have been investigated. The US EPA has also specified in 40 CFR 90 a thyroid dose limit of 75 mrem/y for a member of the general public. This dose limit could be readily met at a typical FRP site with an RF value of about 10 or less. Therefore, the limit of 5 mCi/GW(e)-y is more restrictive than the thyroid dose limit for ^{129}I. The absence of ^{131}I in effluents from processing of aged fuels makes analysis of ^{129}I somewhat easier. However, in-line, real-time monitoring for ^{129}I in FRP gas streams is currently not feasible. Moisture, chemicals, and other radioactive fission products interfere with in-plant measurements. Samples collected over several days must be taken to a laboratory for ^{129}I analysis. Measurement techniques currently in use or under investigation include neutron activation analysis, scintillation counting, mass spectroscopy, and gas chromatography coupled with electron capture detection. 26 references, 3 figures, 7 tables.

30351 **(SAND—82-2714) 1982 Subseabed Disposal Program: geotechnical laboratory and modeling studies. Annual report, October 1981-September 1982.** Lipkin, J. (ed.). (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 615p. NTIS, PC A99/MF A01; 1; GPO Dep. Order Number DE84012482.

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This document describes the laboratory and modeling efforts being undertaken necessary to characterize marine sediment responses to combined thermal and mechanical loading of interest to the Subseabed Disposal Program (SDP). Laboratory efforts include those related to site studies as well as those associated with acquiring data for the models and providing an assessment of the validity of the modeling efforts. Numerical models being developed in this area of the SDP focus on the sediment responses associated with emplacement activities and the long-term interactions between the sediment and an emplaced waste canister. The appendices of the document present detailed results obtained by SDP Principal Investigators involved in geotechnical studies during fiscal year 1982.

30352 **(SAND—82-2717) 1982 subseabed disposal program annual report. Thermal response studies, October 1981 through September 1982.** Percival, C.M. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1984. Contract AC04-76DP00789. 340p. NTIS, PC A15/MF A01; 1; GPO Dep. Order Number DE84011160.

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This report covers the FY82 Thermal Response Studies conducted by the Subseabed Disposal Program. A summary of the work is given in the Introduction, and detailed discussions are included as appendices. The major accomplishment during FY82 was completion of the simulation of the In Situ Heat Transfer Experiment (ISHTE). Other work included development of the electrical control systems and mechanical systems for ISHTE and laboratory experiments using porous media to be used in qualifying the porous flow code MARIAH.

30353 **(SAND—83-1166) NNWSI repository operational procedures for receiving, packaging, emplacing, and retrieving high-level and transuranic waste.** Dennis, A.W.; O'Brien, P.D.; Mulkin, R.; Frostenson, J.C. (Sandia National Labs., Albuquerque, NM (USA); Los Alamos Technical Associates, Inc., NM (USA)). May 1984. Contract AC04-76DP00789. 75p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012935.

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The Nevada Nuclear Waste Storage Investigations project has as one of its principal objectives the conceptual design of the buildings and facilities that will be required at a repository for commercially generated radioactive waste. This report has been prepared for use by the repository designers in the conceptual design of the high-level and transuranic waste-handling facilities and equipment. The report contains a description of the radioactive waste expected at the repository; a description of the shipping casks and the facility casks; and a description of the waste receiving, handling, packaging, transfer, and emplacement operations. Waste retrieval operations are also discussed.

30354 **(SAND—83-1808) Circulation modeling for seabed disposal of nuclear wastes: status, progress and intercomparisons. Report of the interim meeting of the Seabed Working Group Physical Oceanography Task Group, Cambridge, U.K., 31 August-3 September 1982.** Robinson, A.R. (ed.). (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 190p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84012489.

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The use of ocean circulation models is paramount in assessing the long-term effects and safety of subseabed disposal of radioactive waste. A number of different models are necessary for the various questions involved. At present, seabed waste disposal problems are being modeled by: existing ocean circulation models, which have been modified specifically for waste disposal problems, and special purpose models developed exclusively for waste disposal problems. The UK, FRG and USA programs have each implemented applicable general circulation models (GCMs) for the Atlantic Ocean. In addition, the FRG has a coarse-resolution world GCM and the UK has a 2-dimensional model with general and periodic boundary conditions as well as a 42-box model for the North Atlantic. The USA has a regional eddy-resolving model and a nested boxes model in which nested boxes are connected through regional boxes to the world ocean. Simulations to date include preliminary tracer-release studies of various kinds (Section II). The Physical Oceanography Task Group (POTG) of the Seabed Working Group (SWG), which coordinates the development of modeling work relevant to seabed waste disposal, has focussed here on the common problems of GCM and box circulations: convergence, intercomparability, reliability in predicted vertical velocity fields, and methodologies for efficiency in dispersion computations. International efforts have been summarized (Section II) and synthesized in modeling tables (Section IV), and detailed plans for model intercomparisons have been formulated (Section V).

30355 **(SAND—83-2037) NEA Seabed Working Group status on site qualification for nuclear waste disposal within deep-sea sediment.** Auffret, G.; Buckley, D.; Laine, E.; Schuttenhelm, R.; Searle, R.; Shephard, L. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 61p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012884.

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The NEA Seabed Working Group is evaluating the feasibility of disposing of high-level radioactive wastes beneath the seafloor. An integral part of this evaluation includes a detailed investigation of the geological, geochemical, and geophysical characteristics of the seafloor sediments that comprise the primary containment barrier to the possible release of radionuclides. This document presents the status of these investigations in locations being considered by the Seabed Working Group's Site Selection Task Group in the North Atlantic and North Pacific Ocean Basins as of calendar year 1982.

30356 **(SAND—83-2122) Eighth international NEA/Seabed Working Group meeting Varese, Italy, May 30-June 3, 1983.** Anderson, D.R. (ed.). (Sandia National Labs., Albuquerque, NM (USA)). Apr 1984. Contract AC04-76DP00789. 402p. (CONF-8305201—). NTIS, PC A18/MF A01; 1; GPO Dep. Order Number DE84012873.

From 8. international NEA/seabed working group meeting; Varese, Italy (30 May 1983).

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Participants in the NEA/Seabed Working Group meeting were Belgium, Canada, Commission of the European Communities, Federal Republic of Germany, France, Japan, the Netherlands, Switzerland, United Kingdom, and the United States. The following task group reports are included: systems analysis; site selection; biology; physical oceanography; sediment and rock; waste form and canister; and engineering studies.

30357 **(SAND—83-2507) Field tests of stress measurement techniques in rock salt.** Stormont, J.C.; Matalucci, R.V.; Morgan, H.S. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1984. Contract AC04-76DP00789. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012916.

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Three underground field tests were performed in southeastern New Mexico as part of the US Department of Energy's Waste Isolation Pilot Plant (WIPP) Research and Development Program. These tests, one in potash-rich halite and two in relatively pure halite (rock salt), investigated the feasibility of using borehole inclusion stressmeters to measure in situ stress and stress changes in salt. The tests provided a comparison of inclusion stressmeters and demonstrated various qualities of gage response, including time-dependent characteristics, repeatability, and the effects of preload. Three gage types comprising five gages were used: (1) the strain-gaged stressmeter (SGS); (2) two US Bureau of Mines (USBM) hydraulic pressure cells called the borehole pressure cell (BPC) and the cylindrical pressure cell (CPC); and (3) two development pressure cells called the USBMX and the Sandia Pressure Cell (SPC). Gage response has been reasonably consistent. However, further study is required of the correlations between gage types and between gage output and the in situ state of stress. 13 references, 16 figures, 2 tables.

30358 **(SAND—83-7131) NNWSI preliminary radiological monitoring plan for the environment.** Saari, S.; Hoffer, R. (Mitre Corp., McLean, VA (USA). METREK Div.). Jun 1984. Contract AC04-76DP00789. 188p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84012874.

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The Nevada Nuclear Waste Storage Investigations are focusing on the tuff formations under Yucca Mountain, Nye County, Nevada, as a potential site for a geologic repository for high-level radioactive waste and spent nuclear fuel. As part of these ongoing Department of Energy studies, the MITRE Corporation has prepared a preliminary radionuclide monitoring program for that location. An environmental monitoring program is proposed to identify specific radionuclides which may be detected in air, water, soil, and biota. This monitoring plan addresses the preoperation, construction, and operation phases of the repository development. Further research needs are also recommended.

30359 **(SAND—84-0986C) In situ tests and instrumentation in the WIPP facility.** Tyler, L.D. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 12p. (CONF-8405165—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011485.

From CEC/NEA workshop; Brussels, Belgium (15 May 1984).

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The WIPP (Waste Isolation Pilot Plant) is a DOE R and D Facility for the purpose of developing the technology needed for the safe disposal of the United States defense related radioactive waste. The in situ test program is defined for the thermal-structural

interactions, plugging and sealing, and waste package interactions in a salt environment. An integrated series of large-scale underground tests address the issues of both systems design and long term isolation performance of a repository.

30360 **(STI/PUB—649-Vol.3) Radioactive waste management. Volume 3. Proceedings Series.** (International Atomic Energy Agency, Vienna (Austria)). 1984. 558p. (CONF-830523—Vol.3). UNIPUB, PO Box 433, Murray Hill Station, New York, NY 10157. Order Number TI84012209.

From International conference on radioactive waste management; Seattle, WA, USA (16 May 1983).

This volume covers papers presented at the following sessions: general aspects of storage and disposal of radioactive wastes; national concepts of storage and disposal of radioactive waste; underground pilot projects on storage and disposal of high-level waste; repository concepts for disposal of high-level waste; and disposal of low-and intermediate-level wastes.

30361 **(USGS-OFR—83-912) Evaluation of seismic reflection studies in the Yucca Mountain area, Nevada test site.** McGovern, T.F. (Geological Survey, Denver, CO (USA); Subsurface, Inc., Parker, CO (USA)). 1983. Contract AI08-78ET44802. 68p. NTIS, PC A06; 3; GPO Dep. Order Number DE84012137.

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As part of a total geophysical evaluation of Yucca Mountain for use as a Nuclear Waste Repository the seismic reflection technique has been applied. This study has been conducted to analyze the historical and technical efforts which have been used by three geophysical contractors employing a wide variety of techniques ranging from the most simple to very elaborate 3-D surveys. In each case elaborate noise studies were conducted, and based upon their evaluation parameters were chosen for multifold CDP recording. In every case, the signal-to-noise ratio was such that no reflections were discernable. Since the reflections cannot be separated from the noise even using very elaborate noise suppression techniques and up to 384 fold multiplicity it is apparent that in this volcanic terrain reflection surveys cannot work. 14 references, 35 figures, 5 tables.

30362 **(USGS-OFR—84-149) Geohydrologic and drillhole data for test well USW H-3, Yucca Mountain, Nye County, Nevada.** Thordarson, W.; Rush, F.E.; Spengler, R.W.; Waddell, S.J. (Geological Survey, Denver, CO (USA)). 1984. Contract AI08-78ET44802. 31p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012825.

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This report presents data collected to determine the hydraulic characteristics of rocks penetrated in test well USW H-3. The well is one of a series of test wells drilled in and near the southwestern part of the Nevada Test Site, Nye County, Nevada, in a program conducted in cooperation with the US Department of Energy. These investigations are part of the Nevada Nuclear Waste Storage Investigations to identify suitable sites for storage of high-level radioactive wastes. Data on drilling operations, lithology, borehole geophysics, hydrologic monitoring, pumping, swabbing, and injection tests for the well are contained in this report.

30363 **(ORNL-tr—5123) Conditions for the test emplacement of intermediate-level radioactive wastes in chamber 8a of the 511 m level of the Asse Salt Mine.** (Oak Ridge National Lab., TN (USA); Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.)). 1984. Contract AC05-84OR21400. Translation source information not available . 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012862.

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The Gesellschaft fuer Strahlen- und Umweltforschung mbH (GSF) emplaces intermediate-level radioactive wastes which accumulate in an activity involving the use of radioactive materials that is licensed or reported in the Federal Republic of Germany or which are stored on an interim basis by the appropriate licensing or inspection agencies in chamber 8a of the 511 m level of the Asse Salt Mine in Remlingen near Wolfenbuettel in conjunction with an engineering test program. The type and form of the intermediate-level wastes must conform to certain conditions so that there are no hazards to personnel and the repository during transfer and subsequent storage. It is therefore necessary for the radioactive wastes to be treated and packaged before delivery in such a way that they satisfy the conditions presented in this document. The GSF shall inform the companies and organizations delivering wastes about its experiences with emplacement operations. The Conditions for the Test Emplacement of Intermediate-Level Radioactive Wastes in Chamber 8a of the 511 m Level of the Asse Salt Mine must be adapted to conform to the latest state of science and the art. The GSF must therefore reserve the right to modify the conditions, allowing for an appropriate transition period.

30364 **(ORNL-tr—5122) Conditions for the storage of low-level radioactive wastes in the ASSE salt mine.** (Oak Ridge National Lab., TN (USA); Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.)). 1984. Contract AC05-84OR21400. Translation source information not available . 26p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012868.

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The Gesellschaft fuer Strahlen- und Umweltforschung mbH (GSF) emplaces in the ASSE salt mine in Remlingen near Wolfenbuttel low-level radioactive wastes which accumulate in an activity involving the use of radioactive materials that is licensed or reported in the Federal Republic [of Germany] or wastes which are stored on an interim basis by the appropriate licensing or inspection agencies. The type and form of the low-level wastes must conform to certain conditions so that there are no hazards to personnel and the repository during transfer and subsequent storage. It is therefore necessary for the radioactive wastes to be treated and packaged before delivery in such a way that they satisfy the conditions presented in this document. The GSF shall inform the companies and organizations delivering wastes about its experiences with emplacement operations. The Conditions for the Storage of Low-Level Radioactive Wastes in the ASSE Salt Mine must be adapted to conform to the latest state of science and the art. The GSF must reserve the right to modify the Conditions accordingly.

30365 **Geochemistry of the Dakota Formation of northwestern New Mexico: relevance to radioactive waste studies.** Brookins, D.G. (University of New Mexico Geology Department, Albuquerque, New Mexico 87131). *Nuclear Technology;* **59**: No. 3, 420-428(Dec 1982).

The Dakota Formation of the San Juan Basin in northwestern New Mexico consists predominantly of well-cemented sandstones and arenaceous mudstones. Clay mineral-rich rocks, derived from volcanic ash, are mapped as bentonites. The likely physical conditions during burial were temperatures between 35 to 60°C and a pressure of about 0.5 kbar. X-ray studies reveal a mixture of montmorillonite, kaolinite, illite, and mixed layer clay minerals. The typical cation exchange capacities range from 20 to 40 meq/100 g for most samples. Radiometric age determinations of clay minerals by the K-Ar method yield 90 to 94 millions of years before present (MYBP) and Rb-Sr ages yield 93 + or - 8 MYBP. These dates agree with paleontological ages and indicate closed-system conditions for potassium, argon, rubidium, and strontium in these rocks. Closed-system conditions for cesium are inferred based on its greater retentivity than rubidium and potassium in clay-rich rocks. Neutron activation analysis (NAA) of the Dakota samples indicates normal lanthanide abundances and distribution in the bentonitic rocks; local lanthanide enrichment is noted where local uranium accumulations are noted. The uranium has been derived from several sources and fixed in the Dakota Formation at various times from roughly 60 to near 0.25 MYBP. The chalcophile elements copper, antimony, and lead are often fixed with uranium in organic-rich rocks and apparently have not migrated since fixation, even under oxidizing conditions. No mobilization for the lanthanides and barium is noted either. Collectively, the radiometric ages and NAA data indicate the bentonite and bentonite-sand mix to be suitable for overpack in radioactive waste repositories.

30366 **Basalt as a potential waste package backfill component in a repository located within the Columbia River basalt.** Wood, M.I.; Coons, W.E. (Rockwell Hanford Operations Basalt Waste Isolation Project, Richland, Washington 99352). *Nuclear Technology;* **59**: No. 3, 409-419(Dec 1982).

The two major functions of a backfill are considered to be the exclusion of water from the waste package and chemical retardation of radionuclide migration. Preliminary experiments were conducted with Umtanum basalt, water, and various waste forms including simulated spent fuel, supercalcine, and borosilicate glass to determine the feasibility of using basalt as a potential backfill component. Basalt is being evaluated principally as a chemical barrier. Experiments done in the temperature range of 100 to 300°C with only waste form and water show nearly complete dissolution of cesium, rubidium, and molybdenum. However, in parallel experiments, where basalt was added to the system, cesium, rubidium, strontium, and molybdenum were almost completely removed from solution. Analyses of solid run products indicate the formation of pollucite ($(Cs,Rb,Na)AlSi_2O_6 \cdot H_2O$) and powellite ($CaMoO_4$). It is suggested that the glass component of the basalt reacts to form the stable solid phases that fix these elements. Also, rubidium is likely to follow cesium into a plagioclase structure and strontium may be found in plagioclase or powellite. Thus, given the ready availability and reactive nature of basalt, it is a recommended candidate backfill material for use at the Hanford Site.

30367 **Chemical aspects governing the choice of backfill materials for nuclear waste repositories.** Beall, G.W.; Allard, B. (Oak Ridge National Laboratory, Chemistry Division Oak Ridge, Tennessee 37830). *Nuclear Technology;* **59**: No. 3, 405-408(Dec 1982).

A general method of selection of backfill material for nuclear waste disposal has been derived from a large body of data on sorption of actinides and fission products. These sorption studies identified four major factors of importance in enhancing sorption: pH, chemi-sorption, oxidation-reduction, and special reactions with clay minerals. It appears that simple cation exchange plays a very minor role, especially in the pH range of 7 to 9 that is common to groundwaters. In addition to consideration of radionuclide retardation, physical factors such as water retardation and thermal conductivity have been incorporated in the design. All of the materials employed in the backfill are natural minerals that are commercially available.

30368 **Backfill performance requirements--estimates from transport models.** Wood, B.J. (Rockwell Hanford Operations P.O. Box 800, Richland, Washington 99352). *Nuclear Technology;* **59**: No. 3, 390-404(Dec 1982). Contract AC06-77RL01030.

Since backfill is just one part of a waste package that might contain five or more components, its performance has been considered as part of the performance of the whole package. A simple method has been developed for estimating the required behavior of this complete system. The method is based on: federal regulations concerning permissible concentrations in solution at the point of discharge to the accessible environment; a simple and conservative transport model; and baseline and potential "worst-case" release scenarios. Use of the transport model enables calculation of maximum permissible release rates within a repository for each of the scenarios. The maximum permissible release rates correspond to performance requirements for the engineered barrier system. It has been determined from the model that the most important nuclides in spent fuel located in a repository in basalt at Hanford are: ^{129}I, ^{79}Se, ^{99}Tc, ^{107}Pd, ^{237}Np, ^{239}Pu, ^{240}Pu, ^{242}Pu ^{241}Am, ^{243}Am, and members of the ^{238}U decay chain. The maximum permissible release rates for the waste package have been translated into concentrations at the inner and outer surfaces of the backfill under low- and high-flow conditions. It appears that solubility constraints should control the concentrations of uranium and possibly of plutonium, americium, neptunium, and selenium below the required levels.

30369 **Decontamination processes for waste glass canisters.** Rankin, W.N. (E. I. du Pont de Nemours & Company, Savannah River Laboratory, Aiken, South Carolina 29808). *Nuclear Technology;* **59**: No. 2, 314-320(Nov 1982). Contract AC09-76SR00001.

A Defense Waste Processing Facility (DWPF) is currently being designed to convert Savannah River Plant liquid, high-level radioactive waste into a solid form, such as borosilicate glass. To prevent the spread of radioactivity, the outside of the canisters of waste glass must have very low levels of smearable radioactive contamination before they are removed from the DWPF. Several techniques were considered for canister decontamination: high-pressure water spray, electropolishing, chemical dissolution, and abrasive blasting. An abrasive blasting technique using a glass frit slurry has been selected for use in the DWPF. No additional equipment is needed to process waste generated from decontamination. Frit used as the abrasive will be mixed with the waste and fed to the glass melter. In contrast, chemical and electrochemical techniques require more space in the DWPF, and produce large amounts of contaminated by-products, which are difficult to immobilize by vitrification.

30370 **Analytical approximations for the long-term decay behavior of spent fuel and high-level waste.** Malbrain, C.M.; Deutch, J.M.; Lester, R.K. (Massachusetts Institute of Technology, Department of Nuclear Engineering, Cambridge, Massachusetts 02139). *Nuclear Technology;* **57**: No. 2, 292-305(May 1982).

Simple analytical approximations are presented that describe the radioactivity and radiogenic decay heat behavior of high-level wastes (HLWs) from various nuclear fuel cycles during the first 100,000 years of waste life. The correlations are based on detailed computations of HLW properties carried out with the isotope generation and depletion code ORIGEN 2. The ambiguities encountered in using simple comparisons of the hazards posed by HLWs and naturally occurring mineral deposits to establish the longevity requirements for geologic waste disposal schemes are discussed.

30371 **Interactions of backfill materials with cesium in a bittern brine under repository conditions.** Komarneni, S.; Roy, R. (The Pennsylvania State University, Materials Research Laboratory, University Park, Pennsylvania 16802). *Nuclear Technology;* **56**: No. 3, 575-579(Mar 1982).

The following potential backfill materials have been studied: phillipsite, clinoptilolite, mordenite, montmorillonites, vermiculites, chlorite, kaolinite, labradorite, and shales. Each of these was hydrothermally reacted with Cs_2MoO_4, a possible cesium phase in spent fuel elements, in the presence of a bittern brine at 200°C for two months under a confining pressure of 300 bars. Analyses of the product solutions indicated that montmorillonites, vermiculites, and zeolites fixed (as determined by resistance to K+ washing) the greatest fractions of the added cesium while other minerals, labradorite, and shales fixed only about 10% of the added cesium. For example, montmorillonite from Arizona and phillipsite from California fixed 47 and 50%, respectively, of the cesium added. X-ray diffraction analysis of the solid products revealed that cesium was fixed in the interlayers of montmorillonite as indicated by the collapse of the c-spacing from 15.5 to 12.1 A. Cesium interaction with clinoptilolite and mordenite zeolites did not result in their alteration or in any new cesium minerals as observed by x-ray diffraction. The cesium aluminosilicate mineral, pollucite, was detected only with phillipsite-cesium interactions in brine unlike in the hydrothermal interaction of these materials with Cs_2MoO_4 in deionized water where the presence of pollucite was found earlier to be pervasive. Powellite, $CaMoO_4$, was the only new phase found in all these interactions by x-ray diffraction which resulted from the combination of calcium from brine with molybdenum from Cs_2MoO_4. Montmorillonites among clay minerals and zeolites such as clinoptilolite and mordenite seem to be the best backfill materials in salt.

30372 **Continuous-flow leaching studies of crushed and cored SYNROC.** Coles, D.G.; Bazan, F. (University of California, Lawrence Livermore National Laboratory, Livermore, California 94550). *Nuclear Technology;* **56**: No. 2, 226-237(Feb 1982).

Both crushed (150- to 300- μm) and cored (1,8- mm-diam) samples of SYNROC have been leached with single-pass continuous-flow leaching equipment. Crushed samples of cesium-hollandite were also leached in a similar experiment. Temperatures used were 25° and 75°C and leachates were 0.03 N $NaHCO_3$ and distilled

water. Leaching rates from SYNROC-C were ranked cesium > strontium ≧ calcium > barium > zirconium. A comparison of leaching rates is made between crushed SYNROC, cored SYNROC, and Pacific Northwest Laboratory 76-68 glass beads. This comparison depends on how the surface areas are determined for each sample. Based on geometric surface areas for SYNROC cores and glass beads, cesium leach rates from SYNROC compare well with both sodium and neptunium leached from the glass. The other elements leached from SYNROC are lower than sodium and neptunium leached from glass. They also vary for each element, while glass shows nearly the same leach rate for both sodium and neptunium.

30373 **Nuclear waste partitioning and transmutation.** Blomeke, J.O.; Croff, A.G. (Oak Ridge National Laboratory Chemical Technology Division, P.O. Box X, Oak Ridge, Tennessee 37830). *Nuclear Technology;* **56**: No. 2, 361-371(Feb 1982).

The long-term (>1000 years) hazard of radioactive waste emplaced in a geologic repository could be reduced by separating the most significant long-lived radionuclides and transmitting them to stable products by bombardment with neutrons in power reactors. A cost-risk-benefit analysis of this concept shows that, while it is technically feasible to partition and transmute the principal long-lived constituents, there are no cost-risk-benefit incentives that can be identified. The cost of partitioning and transmuting the actinide elements is estimated to be $9.2 million/GW(electric) X yr (1.28 mill/kWh(electric)). The short-term radiological risk is increased by 0.003 health-effect/GW(electric) X yr, and the expected long-term benefit (i.e., incremental risk reduction from a repository) is 0.06 health-effect/GW(electric) X yr integrated over 1 million years. The latter is only about 0.001% of the health-effects expected from natural background radiation and is equivalent to $32,400 per person-rem saved. If nonradiological risks are included, the short-term risk actually exceeds the long-term benefits.

30374 **MCC-1: a standard leach test for nuclear waste forms.** Strachan, D.M.; Barnes, B.O.; Turcotte, R.P. (Pacific Northwest Laboratory, P.O. Box 999, Richland, Washington 99352). *Nuclear Technology;* **56**: No. 2, 306-312(Feb 1982).

A Materials Characterization Center (MCC) has been established by the U.S. Department of Energy at the Pacific Northwest Laboratory (PNL). Five proposed standard leach tests and typical results using the MCC-1 static test are presented. For the borosilicate glass studied (PNL 76-78), fivefold replicate experiments show that errors in elemental leach values are usually less than + or - 10%. Regular time-dependent leach curves are obtained, and no significant difference is observed between pure water and simulated silicate/bicarbonate ground water results. Leaching in salt brine is quite different, especially as shown by elemental depth profiles in the solid; these profiles show significant magnesium penetration into the gel layer from the brine solution.

30375 **Leaching properties and chemical composition of calcines produced at the Idaho Chemical Processing Plant.** Staples, B.A.; Paige, B.E.; Rhodes, D.W.; Wilding, M.W. (Exxon Nuclear Idaho Inc., P.O. Box 2800 Idaho Falls, Idaho 83401). *Nuclear Technology;* **56**: No. 2, 301-305(Feb 1982).

Aqueous wastes from the reprocessing of nuclear fuels at the Idaho Chemical Processing Plant are solidified in the Waste Calcination Facility. The calcined wastes are then stored in stainless steel bins contained in concrete vaults. It has been determined that the radionuclides of cesium and strontium leach readily on contact with aqueous solutions from the particulate fresh product calcine. Thus, the calcine may require further treatment for final disposal. Calcine that is stored up to 12 years has remained particulate and its chemical and other physical properties are similar to those of the original product calcine.

30376 **Comparative leaching behavior of SYNROC B and a borosilicate glass.** Kennedy, C.R.; Arons, R.M.; Dusek, J.T.; Flynn, K.F. (Argonne National Laboratory Materials Science Division, 9700 S. Cass Avenue, Argonne, Illinois 60439). *Nuclear Technology;* **56**: No. 2, 278-288(Feb 1982).

Specimens of SYNROC B were fabricated under a variety of conditions and doped with simulated radwaste species. Two of the component phases of SYNROC B, perovskite and zirconolite, doped with strontium and uranium, respectively, were also fabricated. All specimens were carefully characterized for both phase content and dopant partitioning via x-ray diffraction and electron beam microanalysis techniques. These specimens were then subjected to neutron activation and leached, and the leachant was analyzed by gamma spectrum analysis. All data were compared with similar analyses of Pacific Northwest Laboratory glass 76-68, a borosilicate glass. It was found that both perovskite and properly prepared SYNROC B leach at about the same rate as the borosilicate glass, while zirconolite appears to be at least an order of magnitude more resistant to leaching. When SYNROC is prepared under undesirable conditions and contains $Ba_2Ti_9O_{20}$, cesium leach rates are one to three orders of magnitude higher than in the correctly composed SYNROC B.

30377 **Mechanisms that control aqueous leaching of nuclear waste glass.** Simmons, J.H.; Barkatt, A.; Macedo, P.B. (Catholic University of America, Vitreous State Laboratory, Washington, DC 20064). *Nuclear Technology;* **56**: No. 2, 265-270(Feb 1982).

The development of predictive models and risk calculations for the time evolution of radioactive isotope leaching from fixation solids depends on many factors, including measurement accuracy, measurement relevance, a complete understanding of possible dissolution mechanisms, and the ability to project worst case conditions for all appropriate mechanisms. Some of the mechanisms observed and understood at present are the mechanisms of dissolution of glasses in neutral unbuffered water, the effects of structural disintegration of the glass protective layer, the effects of slowly flowing bath waters and possibly, the mechanisms of leach-rate reduction by solution saturation. The mechanisms that control radiation and temperature effects including alpha particle emission and nuclear transmutations are as yet little understood or investigated.

30378 **Leach testing of Idaho Chemical Processing Plant final waste forms.** Schuman, R.P. (Exxon Nuclear Idaho Co., Inc. P.O. Box 2800, Idaho Falls, Idaho 83401). *Nuclear Technology;* **56**: No. 2, 256-264(Feb 1982).

A number of pellets and highly durable glasses, prepared from nonradioactive simulated high-level waste calcines, have been leach tested. The leach tests were patterned on the International Atomic Energy Agency standard test and the proposed Materials Characterization Center tests. Most tests were made with static distilled water at 25, 70, 95, 250, and 350°C and in refluxing distilled water at 95°C. Leach rates were determined by analyzing the leachate by instrumental activation analysis or spectrochemical analysis and from weight loss. The leach tests were run on solid pieces of glass (cast and core-drilled cylinders and broken pieces) and on coarse ground glass. Solid pieces gave higher leach rates than ground glass. Cesium, molybdenum, sodium, and weight loss leach rates of solid pieces of glass in distilled water were comparable and varied from $<10^{-7}$ g/cm² day at 25°C to about 10^{-3} g/cm² day at 250°C. The leach rates in static distilled water at 95°C were lower than those in refluxing distilled water at the same temperature. Even at 25°C, sodium, cesium, and molybdenum readily leached from the porous pellets, but the pellets showed no visible attack, even at 250°C.

30379 **Application of glass corrosion concepts to nuclear waste immobilization.** Clark, D.E.; Maurer, C.; Urwongse, L. (University of Florida, Ceramics Division Department of Materials Science and Engineering Gainesville, Florida 32611). *Nuclear Technology;* **56**: No. 2, 212-225(Feb 1982). Contract FG01-84CE90144.

Characterization of glass corrosion requires a comprehensive evaluation of the mechanisms by which corrosion can occur. Furthermore, several such mechanisms may be operative during the lifetime of the glass. A variety of surface and solution analytical techniques have been used to achieve a better understanding of the interaction of glass with its environment. The use of at least one surface and one solution analysis technique is essential in any glass corrosion experiment. This is especially important for more com-

plex systems, such as nuclear waste glasses, which may involve complex surface film formation.

30380 **Overview: Argonne workshop on comparative leaching behavior of radioactive waste forms.** Friedman, A.M. (Argonne National Laboratory, Chemistry Division 9700 South Cass Avenue, Argonne, Illinois 60439). *Nuclear Technology;* **56**: No. 2, 210-211(Feb 1982).

To enhance interaction between the various disciplines which are basic to waste management, Argonne National Laboratory in 1979 initiated a series of workshops on fundamental problems in nuclear waste management. This is the second workshop in that series and the topic was chosen for the following reasons. The national radioactive waste program is rapidly approaching the construction of the first waste isolation pilot plant. Because of this it is becoming more and more important to decide on feasible candidates for the waste form, canister, and overpack materials. A great deal of effort has been expended in studies of the fabrication and properties of the various components of the waste package, and this is especially true of the waste form itself.

30381 **A criterion for selecting leach test specimen sizes.** Pescatore, C.; Machiels, A.J. (University of Illinois, Nuclear Engineering Program Urbana, Illinois 61801). *Nuclear Technology;* **56**: No. 2, 297-300(Feb 1982).

When leaching is controlled by a diffusion process, leach test results are particularly simple to interpret when test specimens approximate semi-infinite media. For spherical and cylindrical leach test samples, a criterion relating the test duration T, the specimen radius R, and the effective bulk diffusion coefficient D, to the desired degree of concurrence to the semi-infinite geometry behavior P, is shown to be given by: $1 - P = \sqrt{\pi DT/R}$. From the proposed criterion, it is concluded that, for glass waste forms, the semi-infinite geometry approximation is met by most test samples except possibly for finely crushed material.

30382 **Dissolution of aluminum-, titanium-, and zirconium-based crystalline waste form components under hydrothermal conditions.** Scheetz, B.E.; Atkinson, S.D.; White, W.B. (The Pennsylvania State University, Materials Research Laboratory, University Park, Pennsylvania 16802). *Nuclear Technology;* **56**: No. 2, 289-296(Feb 1982). Contract AC09-79ET41900.

Solubility effects were measured on ceramic and single crystal alumina, titania, $SrTiO_3$ (perovskite structure), and ceramic zirconia at 300 and 400°C for times of 7 and 18 days. Selected fluids were deionized water, a high-bicarbonate, high-sulfate simulated connate water (about 1% total dissolved solids), saturated NaCl brine, and a high-magnesium, high-calcium bittern brine. There is measurable dissolution of Al^{3+} in the connate water and in the bittern brine only. In both cases this can be related to the low pH conditions expected in these fluids at high temperature and to the increase in aluminum solubility with decreasing pH. The $SrTiO_3$ breaks down to some extent in all fluids in the order bittern brine > NaCl > bicarbonate water > deionized water. Dissolution attack on both titanium and zirconium oxides is very small, indicating that the oxides are stable in the pressure-temperature-fluid composition regime. Breakdown of the perovskite phase appears to be by incongruent dissolution with concurrent precipitation of the titanium oxide.

30383 **Comparative leaching behavior of radioactive waste forms.** Seitz, M.G. (Argonne National Laboratory, 9700 S. Cass Avenue, Argonne, Illinois 60439). *Nuclear Technology;* **56**: No. 2, vp(Feb 1982).

The papers published in this volume and presented at the Second Argonne Workshop held September 3-4, 1980, describe leach tests, mechanisms of leaching, and comparison of leach properties of candidate nuclear waste forms. The information reported in these papers is of considerable importance to the technical community that will shortly begin more extensive testing of a few selected waste forms. Leach tests have proven to be a cost effective method of monitoring improvements in durability obtained by changing the composition and manufacturing of various waste forms. These papers report the progress and insight to waste form development that has been obtained by leach testing.

30384 **Migration of brine inclusions in salt.** Pigford, T.H. (The University of California Department of Nuclear Engineering, Berkeley, California 94720). *Nuclear Technology;* **56**: No. 1, 93-101(Jan 1982).

Theories of the migration of brine inclusions in salt are interpreted as simple physical processes, and theories by Russian and U.S. workers are shown to yield the same results. The migration theory is used to predict threshold temperature gradients below which migration of brine inclusions should not occur. The predicted threshold gradients are compared with the temperature gradients expected at the Waste Isolation Pilot Plant in New Mexico. The theory of a threshold gradient helps explain the existence of brine inclusions in natural salt deposits.

0530 Environmental Aspects

REFER ALSO TO CITATION(S) 30183, 30321, 30337, 30344, 30358, 30366, 30367, 30368, 30389, 30392

30385 **(IAEA-TECDOC—296) Environmental assessment methodologies for sea dumping of radioactive wastes. Report based on the joint IAEA/IMO technical committee meeting on environmental assessment methodologies for sea dumping of radioactive wastes in co-operation with UNEP held in Vienna, 30 August - 3 September 1982.** (International Atomic Energy Agency, Vienna (Austria); International Maritime Organization, London (UK); United Nations Environment Programme). Sep 1983. 55p. (CONF-8208174—). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701849.

From Technical committee meeting on environmental assessment methodologies for sea dumping of radioactive wastes; Vienna, Austria (30 Aug 1982).

The IAEA and the IMO, in cooperation with the United Nations Environment Programme (UNEP), jointly convened a Technical Committee to provide guidance to national authorities. This document contains the results of the Technical Committee Meeting in Vienna, August - September 1982 and constitutes guidance to the Contracting Parties to the LDC Convention on the nature and content of the environmental assessment required for permit applications for sea dumping of radioactive wastes.

30386 **(MRP/MRL—82-19(TR)) Tree growth studies on uranium mill tailings.** Murray, D.R.; Turcotte, M. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Jan 1982. 28p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701851.

Coniferous trees planted in 1974 and deciduous species, that have volunteered since 1970 on uranium mill tailings that had been stabilized to varying degrees using limestone and vegetation, were evaluated. Their survival and growth rates were compared with those from other investigations. Competition for light appears to be a major contributor to mortality. Differences in soil moisture conditions under a tree stand as compared to those under a grass sward are potentially significant enough tc affect the tailings hydrology and effluent contamination. Recommendations include planting seeds of deciduous species or deciduous and coniferous seedlings on strips of freshly disturbed tailings. The disturbed strips would provide reduced competition for the initial year and assist in tree survival. The planting of block stands of coniferous or deciduous trees would be useful for evaluating the hydrological impact of the trees as compared to the present grass sward.

30387 **(NUREG/CR—3797) DIGMAN: a computer program to illustrate the complexities in sampling commercial low-level waste sites for radionuclide spills or migration.** Simmons, M.A.; Skalski, J.R.; Swannack, R.; Thomas, J.M. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76RL01830. 33p. (PNL—5028). NTIS, PC A03/MF A01; 1 - GPO $3.75; GPO Dep. Order Number DE84012081.

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The DIGMAN program was developed to illustrate the complexities in sampling a commercial low-level radioactive waste site for spills or migration. Monitoring for both purposes is required

by 10 CFR Part 61. The site-manager (player) is given prior knowledge that a splill has occurred and subsequently migrated through or over the soil surface. In addition, the location is given for one point where some contamination is known to exist. Such an array of information may or may not be available at actual sites. The DIGMAN waste site provides the player with 1600 possible sampling sites, clearly far fewer than would actually be available. Thus, the situations depicted by DIGMAN are perhaps the simplest of the myriad of possible scenarios that might be faced by a site-manager. We invite prospective site-managers (players) to attempt the game.

0540 Health And Safety

REFER ALSO TO CITATION(S) 30317, 30320, 30337, 30370

30388 **(CNEN-NE—1.08) Standard model for safety analysis report of fuel reprocessing plants.** (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). Dec 1979. 203p. (In Portuguese). NTIS (US Sales Only), PC A10/MF A01. Order Number DE84701853.

A standard model for a safety analysis report of fuel reprocessing plants is established. This model shows the presentation format, the origin, and the details of the minimal information required by CNEN (Comissao Nacional de Energia Nuclear) aiming to evaluate the requests of construction permits and operation licenses made according to the legislation in force.

30389 **(EGG-M—04684) Development of a low-level waste risk methodology.** Fisher, J.E.; Falconer, K.L.; Cox, N.D. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 6p. (CONF-840307—36). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011747.

From Waste management '84; Tucson, AZ, USA (11 Mar 1984).

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A probabilistic risk assessment method is presented for performance evaluation of low-level waste disposal facilities. The associated program package calculates the risk associated with postulated radionuclide release and transport scenarios. Risk is computed as the mathematical product of two statistical variables: the dose consequence of a given release scenario, and its occurrence probability. A sample risk calculation is included which demonstrates the method. This PRA method will facilitate evaluation of facility performance, including identification of high risk scenarios and their mitigation via optimization of site parameters. The method is intended to be used in facility licensing as a demonstration of compliance with the performance objectives set forth in 10 CFR Part 61, or in corresponding state regulations. The Low-Level Waste Risk Methodology is being developed under sponsorship of the Nuclear Regulatory Commission. 7 references, 7 figures.

30390 **(INFO—0082) Regulatory process for uranium mines in Canada -general overview and radiation health and safety in uranium mine-mill facilities.** Dory, A.B. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). 22 Jun 1982. 25p. (CONF-8106326—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701906.

From Uranium inquiry meeting; Halifax, Nova Scotia, Canada (22 Jun 1981).

This presentation is divided into two main sections. In the first, the author explores the issues of radiation and tailings disposal, and then examines the Canadian nuclear regulatory process from the point of view of jurisdiction, objectives, philosophy and mechanics. The compliance inspection program is outlined, and the author discussed the relationships between the AECB and other regulatory agencies, the public and uranium mine-mill workers. The section concludes with an examination of the stance of the medical profession on nuclear issues. In part two, the radiological hazards for uranium miners are examined: radon daughters, gamma radiation, thoron daughters and uranium dust. The author touches on new regulations being drafted, the assessment of past exposures in mine atmospheres, and the regulatory approach at the surface exploration stage. The presentation concludes with the author's brief observations on the findings of other uranium mining inquiries and on future requirements in the industry's interests.

30391 **(INFO—0086) Approach to the exemption of materials from regulation as radioactive wastes.** Chatterjee, R.M.; Coady, J.R.; Wagstaff, K.P. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). 15 Sep 1982. 8p. (CONF-820933—10). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701900.

From International conference on radioactive waste management; Winnipeg, Manitoba, Canada (12 Sep 1982).

Staff of the Canadian Atomic Energy Control Board are proposing to establish a general framework for assessing the radiological impact of radioactive waste management practices. This framework features, in addition to the familiar radiation protection principles concerning dose limits and optimization, the concept of trivial doses that are so low that for practical purposes they may be neglected. The rationale for the derivation of numerical criteria for trivial doses is based primarily on consideration of risks to individuals in small and large populations. The concept of trivial individual doses has wide application and significant implications for a variety of waste management practices, including the definition of contaminated materials that are exempt from regulations as radioactive wastes. Examples are given of the practical application of this approach to specific waste disposal issues.

30392 **(INIS-mf—8967) Joint Panel on Occupational and Environmental Research for Uranium Production 1981 annual report.** (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario. Mining Research Labs.). Sep 1982. 47p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780372.

Occupational health and environmental effects associated with the production of uranium are of concern to labour, industry, government and the public. To alleviate this concern the knowledge base for the industry must be expanded. At present there is no single Canadian organization with the authority, expertise or research resources to perform this task independently. The Joint Panel on Occupational and Environmental Research for Uranium Production is a voluntary association of organizations with an active and continuing involvement in this research. Members accept the obligation to inform each other of progress in their on-going work, to contribute to the development of a comprehensive program of research and to make final research results available to the public. This report delineates guiding principles and procedures, lists member organizations, gives highlights of activities during 1981, and provides an update on the status of research projects and publications.

0550 Regulations

REFER ALSO TO CITATION(S) 30288, 30292, 30333, 31292, 31295, 31296

30393 **(CNEN-NE—2.01) Physical protection of nuclear operational units.** (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). Jul 1981. 39p. (In Portuguese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701909.

The general principles of and basic requirements for the physical protection of operational units in the nuclear field are established. They concern the operational units whose activities are related with production, utilization, processing, reprocessing, handling, transport or storage of materials of interest for the Brazilian Nuclear Program.

30394 **(DOE/NBM—4012848) Nuclear materials control in irradiated fuel reprocessing.** (General Electric Co., Richland, WA (USA). Hanford Atomic Products Operation; Phillips Petroleum Co., Idaho Falls, ID (USA). Atomic Energy Div.). Jan 1961. 102p. NTIS, PC A06/MF A01; GPO Dep. Order Number DE84012848.

This report presents the basic principles and techniques which have been found necessary for the establishment and maintenance of an adequate control system for the nuclear materials used in irradiated reactor fuel reprocessing in the United States. In general, the application of these principles and techniques would be required wherever it was necessary for a central agency such as a

State to be able to satisfy either itself or another agency or State regarding the safety, national security, or economy of its atomic installations. The fundamental basis of any system designed to assure efficient control of nuclear materials is the ability to measure accurately the receipt, issue, use, and inventory of all such materials.

30395 **(DOE/NBM—4012849) Information for foreign nations.** (USAEC Division of Nuclear Materials Management, Washington, DC). 1958. 35p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012849.

This booklet sets forth certain material control requirements of the United States Atomic Energy Commission (USAEC) and outlines some of the techniques used in the United States to meet those requirements. This booklet contains the following sections: definitions of terms; material control within the USAEC; surveys by the USAEC of its contractors; example of source and special (SS) materials records for reactors; example of SS material balance report; example of reactor operating records and reports for SS material control; and reactor operating records and reports other than those for the control of SS material.

30396 **(EGG-M—18283) Radioactive waste management as approached by nuclear materials management.** Reyes, B.D. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 4p. (CONF-840307—38). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011749.

From Waste management '84; Tucson, AZ, USA (11 Mar 1984).

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Nuclear Materials Management at EG and G Idaho, Inc., works energetically to maximize recovery of excessed nuclear fuel. This paper summarizes four fuel dispositions of nonroutine or odd lot fuels and supports the concept that recovery is the optimal disposal method. Specific packaging, recordkeeping, and timely disposal problems are described. The need for cooperative planning among nuclear materials and waste management personnel, contract personnel, and the program experimenters who use the fuel is stressed. 1 reference, 2 figures, 1 table.

30397 **(INIS-mf—8906) Order of 24 June 1982 on the technical conditions for controlling and accounting of nuclear materials.** (French Government, Paris). 31 Jul 1982. 2p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780216.

Published in the French Official Gazette No. 176.

This order was made under the Act of 25th July 1980 on protection and control of nuclear materials and the Decree of 12th May 1981 made in pursuance of the Act. It lays down detailed provisions to be complied with by licensees under the 1980 Act. These provisions cover, in particular, records, accounting procedures and physical inventories for the different categories of nuclear materials. (NEA).

30398 **(INIS-mf—8919) Decree of 4 November 1982 on conditions for notification of possession of special fissile materials and source materials and for keeping accounts thereof.** (Italian Government, Rome). 25 Nov 1982. 10p. (In Italian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780206.

Published in the Italian Official Gazette No. 325.

This Decree lays down a detailed procedure for notification of the possession and accounting of special fissile materials and source materials. The Decree was made in pursuance of Decree No. 185 of 13 February 1964 of the President of the Republic concerning radiation protection and licensing procedures. (NEA).

30399 **(K/OA—5643) Semiportable load-cell-based weighing system prototype of 18.14-metric-ton (20-ton) capacity for UF_6 cylinder weight verifications: description and testing procedure.** McAuley, W.A. (Oak Ridge Gaseous Diffusion Plant, TN (USA)). 29 May 1984. Contract AC05-84OT21400. 39p. (CONF-8404153—2). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012853.

From 11. annual meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers; Houston, TX, USA (25 Apr 1984).

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The 18.14-metric-ton-capacity (20-ton) Load-Cell-Based Weighing System (LCBWS) prototype tested at the Oak Ridge (Tennessee) Gaseous Diffusion Plant March 20-30, 1984, is semiportable and has the potential for being highly accurate. Designed by Brookhaven National Laboratory, it can be moved to cylinders for weighing as opposed to the widely used operating philosophy of most enrichment facilities of moving cylinders to stationary accountability scales. Composed mainly of commercially available, off-the-shelf hardware, the system's principal elements are two load cells that sense the weight (i.e., force) of a uranium hexafluoride (UF_6) cylinder suspended from the LCBWS while the cylinder is in the process of being weighed. Portability is achieved by its attachment to a double-hook, overhead-bridge crane. The LCBWS prototype is designed to weigh 9.07- and 12.70-metric ton (10- and 14-ton) UF_6 cylinders. A detailed description of the LCBWS is given, design information and criteria are supplied, a testing procedure is outlined, and initial test results are reported. A major objective of the testing is to determine the reliability and accuracy of the system. Other testing objectives include the identification of (1) potential areas for system improvements and (2) procedural modifications that will reflect an improved and more efficient system. The testing procedure described includes, but is not limited to, methods that account for temperature sensitivity of the instrumentation, the local variation in the acceleration due to gravity, and buoyance effects. Operational and safety considerations are noted. A preliminary evaluation of the March test data indicates that the LCBWS prototype has the potential to have an accuracy in the vicinity of 1 kg.

30400 **(LA-UR—84-1436) Sequential probability ratio controllers for safeguards radiation monitors.** Fehlau, P.E.; Coop, K.L.; Nixon, K.V. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 4p. (CONF-840531—6). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012665.

From 6. annual symposium on safeguards and nuclear material management; Venice, Italy (14 May 1984).

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Sequential hypothesis tests applied to nuclear safeguards accounting methods make the methods more sensitive to detecting diversion. The sequential tests also improve transient signal detection in safeguards radiation monitors. This paper describes three microprocessor control units with sequential probability-ratio tests for detecting transient increases in radiation intensity. The control units are designed for three specific applications: low-intensity monitoring with Poisson probability ratios, higher intensity gamma-ray monitoring where fixed counting intervals are shortened by sequential testing, and monitoring moving traffic where the sequential technique responds to variable-duration signals. The fixed-interval controller shortens a customary 50-s monitoring time to an average of 18 s, making the monitoring delay less bothersome. The controller for monitoring moving vehicles benefits from the sequential technique by maintaining more than half its sensitivity when the normal passage speed doubles.

30401 **(LA-UR—84-1437) Cerenkov methodology for monitoring irradiated reactor fuel.** Nicholson, N.; Dowdy, E.J. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 6p. (CONF-840531—5). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012664.

From 6. annual symposium on safeguards and nuclear material management; Venice, Italy (14 May 1984).

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Attribute measurement methods for confirming declared irradiated fuel inventories at nuclear installations under safeguards surveillance are of significant interest to inspectors. High-gain measurements of the intensity of the Cerenkov glow from exposed assemblies in water-filled storage ponds are promising for this purpose because the measured intensities depend on cooling times and burnup. We have developed a Cerenkov Measuring Device, a hand-held instrument that examines irradiated fuel assemblies in water-filled storage ponds and measures the intensity of the associated Cerenkov glow. In addition, we have developed a method for making such high-gain measurements in the presence of intense ambient light.

30402 **(LA-UR—84-1513) Compact K-edge densitometer.** Cowder, L.R.; Klosterbuer, S.F.; Augustson, R.H.; Esmailpour, A.; Hawkins, R.; Kuhn, E. (Los Alamos National Lab., NM (USA); International Atomic Energy Agency, Vienna (Austria)). May 1984. Contract W-7405-ENG-36. 10p. (CONF-840531—9). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012630.

From 6. annual symposium on safeguards and nuclear material management; Venice, Italy (14 May 1984).

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Los Alamos National Laboratory has designed, built, and is currently testing a compact K-edge densitometer for use by International Atomic Energy Agency (IAEA) inspectors. The unit, which can easily be moved from one location to another within a facility, is positioned outside a glovebox with the body of the instrument inserted into the glove. A fixture inside the glovebox fits around the body and positions a sample holder. A hand-held high-purity germanium detector powered by a battery pack and a Davidson portable multichannel analyzer (MCA) is used to measure the transmission through plutonium nitrate solutions at E/sub Y/ = 121.1 and 122.2 keV. The Davidson MCA is programmed to lead the user through the measurement procedure and perform all the data analyses. The instrument is currently installed at the Safeguards Analytical Laboratory, where IAEA personnel are evaluating its accuracy, ease of operation, and safety. 5 references, 5 figures, 5 tables.

30403 **(LA-UR—84-1516) Automated procedure for performing computer security risk analysis.** Smith, S.T.; Lim, J.J. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 6p. (CONF-840531—8). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012633.

From 6. annual symposium on safeguards and nuclear material management; Venice, Italy (14 May 1984).

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Computers, the invisible backbone of nuclear safeguards, monitor and control plant operations and support many materials accounting systems. Our automated procedure to assess computer security effectiveness differs from traditional risk analysis methods. The system is modeled as an interactive questionnaire, fully automated on a portable microcomputer. A set of modular event trees links the questionnaire to the risk assessment. Qualitative scores are obtained for target vulnerability, and qualitative impact measures are evaluated for a spectrum of threat-target pairs. These are then combined by a linguistic algebra to provide an accurate and meaningful risk measure. 12 references, 7 figures.

30404 **(MLM—3155(OP)) Pu-content verification by calorimetry.** Beets, C.; Carchon, R.; Fettweis, P.; Corbellini, M.; D'Adama, D.; Guardini, S.; Rodenburg, W.W.; Strohm, W.W.; Fiarman, S.; Keddar, A. (Monsanto Research Corp., Miamisburg, OH (USA). Mound; Centre d'Etude de l'Energie Nucleaire, Mol (Belgium); Commission of the European Communities, Ispra (Italy). Joint Research Centre; International Atomic Energy Agency, Vienna (Austria)). May 1984. Contract AC04-76DP00053. 10p. (CONF-840531—10). NTIS, PC A02; 3; GPO Dep. Order Number DE84012367.

From 6. annual symposium on safeguards and nuclear material management; Venice, Italy (14 May 1984).

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The aim of this paper is to present calorimetric assay measurements that were performed on a set of high burnup plutonium samples using the Mound No. 150 twin resistance bridge calorimeter. The samples and the calorimeter are described in the first part of the paper and the experimental results are discussed in a second part. The isotopic composition, obtained by destructive analysis, was combined with the measured power values for the Pu-assay.

30405 **(NUREG/CR—3619) Survey of commercial nonnuclear security programs. Final report.** Ishimoto, W.Y. (SAS of Texas Ltd., Austin (USA)). Mar 1984. 48p. NTIS, PC A03/MF A01 - GPO* $4.00. Order Number DE84901130.

This study provides a limited, but current, review of security techniques and practices used in analogous non-nuclear commercial industries to defend against external threats. Nine non-nuclear commercial industries which engage in high-value or high-risk operations were interviewed. Current security periodicals and books were also reviewed to determine whether there are any unique security practices, techniques, or procedures in use by non-nuclear commercial industries that may benefit the security posture of the NRC and its licensees. The study briefly reviews ten specific types of threat posed by the external adversary; basic reasons for adversarial success; and detection and prevention strategies. The average level of security, as evidenced in practice, and the most stringent level of security used by the interviewees are also examined.

30406 **Risk assessment of alternative proliferation routes.** Ahmed, S.; Husseiny, A.A. (Iowa State University Nuclear Engineering Department, Ames, Iowa 50011). *Nuclear Technology;* **56**: No. 3, 507-515(Mar 1982).

Multi-Attribute Decision Theory is applied to rank II alternative routes to nuclear proliferation in order of difficulty in acquiring nuclear weapons by nonnuclear countries. The method is based on reducing the various variables affecting the decision to a single function providing a measure for the proliferation route. The results indicate that the most difficult route to obtain atomic weapons is through nuclear power reactors, specifically the liquid-metal fast breeder reactor, heavy water Canada deuterium uranium reactor, and light water reactors such as boiling water and pressurized water reactors. The easiest routes are supercritical centrifuge isotope separation, laser isotope separation, and research reactor. However, nonnuclear routes available that result in substantial damage to life and property are easier than any nuclear route.

30407 **Automated in-line measurement of plutonium solutions in a plutonium purification process.** Li, T.K. (University of California, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Nuclear Technology;* **55**: No. 3, 674-682(Dec 1981).

An automated solution assay instrument (SAI) based on transmission-corrected gamma-ray measurements has been developed and installed in the Plutonium Processing Facility at the Los Alamos National Laboratory. The instrument was designed for rapid, nondestructive assay of plutonium process solutions over a wide range of concentrations (0.05 to 500 g Pu/l, with 10^{-4} to 5 g Am/l) and for routine operation by process technicians who lack instrumentation experience. For a 25-ml sample, the precision is $<0.8\%$ for concentrations >30 g Pu/l within a 1000-s assay and $<1.0\%$ for concentrations >4 g Pu/l within a 2000-s assay. The results of test and evaluation demonstrate that the SAI is a reliable and accurate instrument for assaying plutonium process solutions.

30408 **(LA-tr—82-11) Plutonium isotopic analysis with surface ionization mass spectrometry.** Cesario, J. Translated from *Analusis ;* **8**: No. 10, 486-489(1980). Contract W-7405-ENG-36. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014230. DE82014230

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The author briefly describes the basis of isotopic analysis by surface ionization mass spectrometry and its application to plutonium. The various uncertainty factors are discussed; then different ways to improve sensitivity and accuracy are considered.

30409 **(LA-tr—82-2) Plutonium determination by spectrophotometry of plutonium. VI. Control of the nuclear fuel reprocessing plant.** Grison, J. Translated from *Analusis ;* **8**: No. 8, 354-356(1980). Contract W-7405-ENG-36. 8p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE82014226. DE82014226

The plutonium (VI) spectrophotometric determination, after AgO oxidation in 3 M nitric acid medium, is used for the running-control of the nuclear fuel reprocessing plant at La Hague. Analytical device used in glove-box or shielded-cell is briefly described. This method is fast, sensitive, unfailing and gives simple effluents. It is applied by day and night shifts, during Light Water Reactor fuel reprocessing campaign, for 0.5 mg/l up to 20 g/l plutonium solutions. Reference solution measurements have a 0.8 to 1.4% relative

standard deviation; duplicate plutonium determinations give a 0.3% relative standard deviation for sample analysis. There is a discrepancy (-0.3% to -0.9%) between the spectrophotometric method results and the isotopic dilution analysis.

30410 **(LA-tr—82-16) Plutonium determination by isotope dilution.** Lucas, M. Translated from *Analusis ;* **8**: No. 10, 455-462(1980). Contract W-7405-ENG-36. 22p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014325. DE82014325

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The principle of isotope dilution is to add to a known amount of the analyzed solution a known amount of a spiked solution consisting of plutonium 242. The isotopic composition of the resulting mixture is then determined by surface ionization mass spectrometry, and the plutonium concentration in the solution is deduced, from this measurement. Generally a chemical treatment is performed on the mixture, to isolate plutonium from uranium and from fission products before the isotopic analysis, but if plutonium coming from the sample solution and from the spike solution have been put in the same valence state, a quantitative plutonium separation is not necessary. For irradiated fuels neutronic studies or for fissile materials balance measurements which requires the knowledge of the ratio U/Pu or of concentration both uranium and plutonium, it is better to use the double spike isolate dilution method, with a spike solution of known ^{233}U-^{242}Pu ratio. Using this method, the ratio of uranium to plutonium concentration in the irradiated fuel solution can be determined without any accurate measurement of the mixed amounts of sample and spike solutions. For fissile material balance measurements, the uranium concentration is determined by using single isotope dilution, and the plutonium concentration is deduced from the ratio Pu/U and U concentration. The main advantages of isotope dilution are its selectivity, accuracy and very high sensitivity. The recent improvements made to surface ionization mass spectrometers have considerably increased the precision of the measurements. Isotope dilution is the best method for accurate determination of plutonium and uranium concentrations performed on nuclear fuel reprocessing and safeguarding purposes.

30411 **(LA-tr—82-6) On-line plutonium measurement by alpha counting using a glass sensor.** Edeline, J.C.; Furgolle, B. Translated from *Analusis ;* **8**: No. 10, 469-472(1980). Contract W-7405-ENG-36. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014235. DE82014235

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Some cerium activated high purity silica glasses are good sensors for ionizing particles counting. These sensors may be used for measuring plutonium concentrations in corrosive solutions which are typical in reprocessing operations. The thickness of the sensor has been reduced to minimize beta sensitivity. The thin sensor is held by molecular adhesion to a thick glass mount which is soldered to the stainless steel sample cell.

30412 **(LA-tr—82-8) Determination of plutonium content by differential attenuation of two gamma rays.** Despres, M.; Morel, J.; Malet, G. Translated from *Analusis ;* **8**: No. 10, 481-485(1980). Contract W-7405-ENG-36. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014233. DE82014233

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The main interest of this method is the direct measurement of element content in homogeneous liquid or solid. The range concentration of analysis is 10 to 300 $g.l^{-1}$ plutonium. This nondestructive method allows the plutonium measurement either in situ or in a derivate circuit. The inconveniences are the periodic changes of sources and the working difficulties about the detector. The studies have been made to determine the effect of the heavy elements and of the fission products. An apparatus is now studied and realized for the determination of the plutonium isotopic composition.

30413 **(LA-tr—82-14) Automation of plutonium spectrophotometry.** Perez, J.J.; Boisde, G.; Goujon de Beauvivier, M.; Chevalier, G.; Isaac, M. Translated from *Analusis ;* **8**: No. 8, 334-351(1980). Contract W-7405-ENG-36. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014327. DE82014327

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Instrumentation was designed and constructed for automatic control of plutonium by molecular absorption spectrophotometry, on behalf of the reprocessing facilities, to meet two objectives: on-line measurement, of the valency state of plutonium, on by-pass, with the measured concentration covering the process concentration range up to a few $mg.l^{-1}$; laboratory measurement of plutonium adjusted to valency VI, with operation carried out using a preparative system meeting the required containment specifications. For this two objectives, the photometer, optical cell connections are made by optical fibers resistant to β, γ radiation.

30414 **(LA-tr—82-13) Determination of plutonium by spectrophotometry of plutonium (VI) characteristics of the method and important parameters.** Cauchetier, P. Translated from *Analusis ;* **8**: No. 8, 336-343(1980). Contract W-7405-ENG-36. 22p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014328. DE82014328

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The PuO_2^{2+} ion owns a very attractive property for the analyst: in its absorption spectrum there is a narrowest band in the near infrared with a high molar extinction coefficient. It is thus possible to determine very specifically the plutonium concentration, after oxidation by argentic oxide in 4 M nitric acid medium, in the range from $mg.l^{-1}$ to $g.l^{-1}$ in the cuvette. This method requires a very high quality double-beam spectrophotometer. The most important parameters are the spectral band width (less than 0.3 nm at 830 nm), the noise level, the stray light, the scanning speed and of course photometric precision and accuracy. Temperature (-0.55% per $d°C$) and nitrate ions concentration (-1.1% per 0.1 M) have a great influence, as also other complexing anions. For ten years this method has been used to determine plutonium in many matrices; the precision is +- 1 $mg.l^{-1}$ in foot of the range and +-1% on the best. The presently studied improvements turn on the precision, the detection limit and the automated process, and the most meaningful points for each of these purposes are emphasized.

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

0702 Radiation Sources

REFER ALSO TO CITATION(S) 31473

30415 (DOE/ER/60142—1, pp 14-18) **Radiological Research Accelerator Facility.** Goldhagen, P.; Marino, S.; Randers-Pehrson, G.; Rossi, H.H.; Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

The reconstruction of the Radiological Research Accelerator Facility (RARAF) at the Nevis Laboratory of Columbia University is nearing completion. In a previous report the early part of the construction of the RARAF building within the Nevis cyclotron building was described. This year we describe the completion of the building, the RARAF staff, assembly of the 4 MV Van de Graaff accelerator, and the first phase of its operation. 2 references.

30416 (DOE/ER/60142—1, pp 19-22) **Low energy x ray facility.** Rossi, H.H.; Zaider, M. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

In the generalized theory of dual radiation action $\gamma(x)$ is a fundamental function which is a measure of the probability that two energy deposits separated by a distance x will form a radiation lesion. The molecular on experiment was designed to determine this function. It is however clear that $\gamma(x)$ can also be evaluated from the results of experiments with soft x-rays (energies between 0.3 and 4.5 keV). Although this approach presents difficulties because of varying LET of the photoelectrons produced by these radiations it has the important advantage that it can resolve (at least in principle) the function at smaller values of x. Our interest in exploring this method was enhanced by the finding that the theory can be

successfully applied to soft x ray data and the values of $\gamma(x)$ yielded are at least similar to those found in the molecular ion experiment. 4 references, 1 figure.

30417 **(OEFZS—4246) Precise location of nonmetallic pipelines.** Frevert, E.; Kuenzl, K.; Markowitsch, P.; Volkmann, W. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Oct 1983. vp. (In German). (IA—119/83). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701860.

A method is described to conduct precise surveys of nonmetallic pipelines. After a thin stranded wire is pulled through a part of the pipe first an inductive or capacitative prelocation is made, in which especially curves are marked. After that with this wire a go-devil with a 500 mCi ^{60}Co-radiation source is moved slowly from reference point to reference point. On the ground plane the corresponding maximum of the radiation intensity is detected and marked as the position of the pipe. About the experiences of the location of two local gas pipelines with 4987 and 11897 km length is reported. The average length of the located sections was about 300 m, the average distance between two reference points was a little more than 8 m. In the case of curves the distances were reduced to 0.5 - 1.0 m. The output of location was 16 h/km, the daily output ca. 600 m. The accuracy is better than +- 10 cm, while in the case of the inductive prelocation deviations of more than 50 cm could be found. During the locations the delivery of gas was uninterrupted. It can be carried out also in thickly populated regions without any danger by radioactive radiation.

30418 (ZfI-Mitt—71, pp 67-73) **Radiation safety program for portable defectoscopes in industrial buildings.** Prenerov, V.; Shivarov, K.; Ivanov, P. (KZU - Control Welding Kombinat, Sofia (Bulgaria)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A radiation safety program is presented which concerns the administrative and technical measures for carrying out non-destructive tests by gamma defectoscopy in industrial buildings. Successful application of the program is outlined and problems which are not solved up to now are discussed.

30419 (ZfI-Mitt—71, pp 34-39) **Portable gamma-irradiator - a modified model.** Pandev, I.N. (Komitet za Mirno Izpolzuvane na Atomnata Energiya, Sofia (Bulgaria)); Christova, M.G.; Stefanov, S.D.; Gentchev, N.V.; Bakardjiev, S.T.; Christov, C.D.; Genov, D.T. (Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A new modification of a portable gamma-irradiator has been designed with a relatively large irradiation volume, good homogeneity of the gamma field, small overall dimension, light biological shielding, and simple mechanics. It is possible to irradiate materials in two cylindrical volumes (3 l and 6 l) with different dose rates. ^{137}Cs is used as a radiation source. Depending on application, the irradiator can be charged with various total activities up to 6.66 x 10^{14} Bq (18 kCi). The dose rate can be also charged up to the maximum by different positions of the source element. The gamma-irradiator can be used for scientific studies and for industrial purposes.

30420 (ZfI-Mitt—71, pp 40-46) **Planning of dose rate distribution of radiation fields by computer.** Hargittai, P.; Stenger, V. (Magyar Tudomanyos Akademia, Budapest. Izotopintezete). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Computing methods are reported for modelling of radiation fields and also for planning of new facilities.

30421 (ZfI-Mitt—71, pp 47-56) **DOSKMF2 - A contribution to the computer-aided design of dose rate distributions.** Remer, M. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

With a sensible arrangement of several sources it is possible to obtain a homogeneous radiation field in a great volume. The program DOSKMF2 written in the language PL1 solves the problem of computing the effect of all sources in each point of the radiation field. The geometrical conditions are described by two coordinate systems, the first system for the arrangement of radiation sources and tubes and the second system for description of shielding layers in form of concentric circles. The program DOSKMF2 connects both coordinate systems and allows the computation of the exposure rate at all points of the radiation field. A graphic output is possible in the form of isolines. The program DOSKMF2 has been applied for calculation of radiation fields in existent irradiation units and for simulation of new irradiation units for survey calculations or as a help for planning.

30422 (ZfI-Mitt—71, pp 137-143) **Radioisotope gage for automatic control of cotton wool package.** Tabor, P.; Molnar, L.; Nagymihalyi, D. (Magyar Tudomanyos Akademia, Budapest. Izotopintezete). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A summary is given of research work and in-service tests carried out on radiometric gages for on-line control in bandage industry. A special type of thickness gage based on beta absorption measurements restricts the weight fluctuations of ready cotton wool packages to less than +- 2 per cent. Economic effectiveness of the gage is evaluated.

30423 (ZfI-Mitt—71, pp 144-149) **Compensation for thickness variations in determining the bulk material composition on conveyor belts using combined scatter-transmission and thickness measuring methods.** Thuemmel, H.W.; Koerner, G.; Fritzsche, D. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Nuclear techniques (60-keV gamma scattering and transmission and 660-keV gamma transmission) used to determine bulk material compositions at conveyor belts have been combined to compensate errors caused by strong thickness variations. Advantages the system proposed are discussed.

30424 (ZfI-Mitt—71, pp 162-164) **New type of nuclear weighing device for transporter belts.** Kamenov, P.S.; Vapirev, E.I.; Ormandjiev, S.I. (Sofia Univ. (Bulgaria). Fizicheski Fakultet). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

30425 (ZfI-Mitt—71, pp 184-191) **Thin layer activation for industry.** Varkonyi, A. (Magyar Tudomanyos Akademia, Budapest. Izotopintezete). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Thin layer activation (TLA) by a cyclotron has been introduced to wear, corrosion, and erosion measurements in industry. Applying TLA the following side effects should be taken into con-

sideration: thermal effects, hydrogen embrittlement, point defects and dislocations, and microalloying.

30426 (ZfI-Mitt—71, pp 192-203) **Wear testing in power stations.** Hartmann, G.; Kulicke, P. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The following techniques for wear investigations of combustion engines are described: determination of material durability of cylinder liners by neutron activation of zones, determination of maximum temperatures with the aid of kryptonates, and measurement of the scale thickness in diesel engines by absorption of beta particles.

30427 (ZfI-Mitt—71, pp 204-220) **Radioisotopes in wear investigation of combustion engines.** Kras, J.; Banasik, Z. (Institute of Nuclear Research, Warsaw (Poland)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The following techniques for wear investigations of combustion engines are described: determination of material durability of cylinder liners by neutron activation of zones, determination of maximum temperatures with the aid of kryptonates, and measurement of the scale thickness in diesel engines by absorption of beta particles.

30428 (ZfI-Mitt—71, pp 221-234) **Short-term measurements of wear on surfaces activated rails.** Grohmann, H.D. (Zentrales Forschungsinstitut des Verkehrswesens, Brandenburg-Kirchmoeser (German Democratic Republic)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The principles and advantages of surface activation by positively charged particles for wear measurements are dealt with. The results obtained by means of short-term measurements are within the error limits of the results obtained by long-term measurements. Examples of the practical application of the method under various field conditions are given. Decisions on the introduction of wear-reducing measures on the rail, the application of lubrication, or various possibilities of fastening, can be made already after a period of a few weeks or months instead of years by traditional long-term measurements.

30429 (ZfI-Mitt—71, pp 235-251) **Use of thin layer activation in tribological investigations.** Zukowska-Cwik, G.; Kras, J. (Institute of Nuclear Research, Warsaw (Poland)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A procedure for thin layer activation (TLA) of engine parts by 10-Mev protons from a linear accelerator is described including application of TLA to wear investigations of tappets, piston rings, and tooth wheels.

30430 (ZfI-Mitt—71, pp 265-276) **Evaluation of autoradiograms using a microcomputer.** Birkholz, W.; Steinert, M. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

An equipment AURAS for evalutaion of autoradiograms has been developed. It consists of a digital photometer and the densitron system (television scanner) for digitalisation of pictures and a microprocessor for picture processing and storing of datas. The digital photometer permits a precise but time consuming scanning. The densitron system works quickly with little density classes and pseudocolouring of pictures. For the evaluation of autoradiograms with the microcomputer a programsystem MARAUS was written. It works in a dialogeous regime. The possibilities of using the equipment for evaluation of autoradiograms are demonstrated.

30431 **(ZfI-Mitt—71) Radioisotope application and radiation processing in industry. Selected papers of the second working meeting at Leipzig, 28 Sep-1 Oct 1982.** (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. 369p. (CONF-8209165—Exc.). NTIS (US Sales Only), PC A16/MF A01. Order Number DE84780373.

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Selected papers have been indexed separately for inclusion in the Energy Data Base.

0703 Isotopic Power Supplies

REFER ALSO TO CITATION(S) 30988

08 HYDROGEN

0801 Production

REFER ALSO TO CITATION(S) 30473

30432 **(AECL—7682) Hydrogen production methods. A critical assessment.** Hammerli, M. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jul 1982. 83p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84701901.

Old, present and new proceses for producing hydrogen are assessed critically. The emphasis throughout is placed on those processes which could be commercially viable before the turn of the century for large-scale hydrogen manufacture. Electrolysis of water is the only industrial process not dependent on fossil resources for large-scale hydrogen production and is likely to remain so for the next two or three decades. While many new processes, including those utilizing sunlight directly or indirectly, are presently not considered to be commercially viable for large-scale hydrogen production, research and development effort is needed to enhance our understanding of the nature of these processes. Water vapour electrolysis is compared with thermochemical processes: the former has the potential for displacing all other processes for producing hydrogen and oxygen from water.

30433 **(BNL—51747) Chemical/hydrogen energy systems. Annual report, January 1, 1983-December 31, 1983.** (Brookhaven National Lab., Upton, NY (USA)). May 1984. Contract AC02-76CH00016. 107p. NTIS, PC A06/MF A01; GPO Dep. Order Number DE84012876.

This report describes activities carried out in 1983 within the Chemical/Hydrogen Energy Systems Program for which Brookhaven National Laboratory (BNL) provides technical and management support to the US Department of Energy. Progress made by private sector contractors, university researchers, and BNL in-house technical staff is summarized for work in electrolytic hydrogen production, hydrogen storage, materials, and transport systems. Federal guidelines and budgetary allocations are reflected in BNL R & D planning and implementation, where emphasis is placed on developing a technology base for hydrogen which would be used for coupling the abundant/renewable energy resources to the demand sector uses in the far term. The key projects summarized in the report relate to hydrogen generation via water vapor electrolysis (Westinghouse), anode depolarization concepts, (BNL and Texas A & M), hydrogen embrittlement of pipeline steels (Battelle), and the completion of a hydrogen technology evaluation facility at BNL. Also included in this report are a summary of related International Energy Agency cooperative efforts as well as plans and major activities scheduled for 1984.

30434 **(EPRI-EM—3561) Market potential of electrolytic hydrogen production in three northeastern utilities' service territories. Final report.** Fein, E.; Edwards, K. (Futures Group, Glastonbury, CT (USA)). May 1984. 149p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920400.

The study develops a method for exploring the market potential for electrolytic hydrogen. The service areas of three northeastern utilities - Public Service Electric & Gas, Niagara Mohawk, and Northeast Utilities - are examined, and results reported on the effort to locate specialty hydrogen users, determine patterns of hydrogen utilization, and assess the possibility of satisfying this hydrogen demand by electrolytic hydrogen from advanced electrolyzers. Hydrogen users were sought in six major product categories: chemicals, pharmaceuticals, oils, metals, electronics and float glass. Identification of users through appropriate standard industrial classification codes served as a basis for locating possible users in each of the service areas. Mailed questionnaires sought information on hydrogen demand, characteristics of hydrogen use, present hydrogen supply costs, and factors that would influence the purchase of an electrolyzer. In the three utility service areas examined, electrolytic hydrogen can be expected to have limited success competing with merchant hydrogen. Specific hydrogen users may be found whose location with respect to the source of merchant hydrogen may put electrolytic hydrogen at an economic advantage. Reduction in electrolyzer plant costs may be necessary to expand the possibilities for electrolysis. Annual power requirements for current potential demand for electrolytic hydrogen in three utilities was estimated at 140 x 10^6 kWh, which could expand to 240 x 10^6 kWh in ten years.

30435 **(LA-UR—84-182) Modification of the sulfur dioxide-iodine thermochemical hydrogen cycle with lanthanum sulfites and sulfates.** Onstott, E.I.; Bowman, M.G.; Michnovicz, M.F.; Hollabaugh, C.M. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 6p. (CONF-840702—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84006021.

From 5. world hydrogen energy conference; Toronto, Canada (15 Jul 1984).

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Variable composition, insoluble dilanthanum oxide-sulfite-sulfate-hydrates were prepared by reaction of lanthanum dioxymonosulfate with aqueous sulfur dioxide. These compositions reacted with iodine to yield sulfate in the solid phase, and hydrogen iodide and water in the gas phase. The highest yield of hydrogen iodide measured was 32% at 660 K for a few seconds reaction time of iodine with a reactant containing oxide-sulfite-sulfate with the approximate stoichiometry numbers, 0.9, 1.1, 1.0. Higher yields of hydrogen iodide were obtained by a second iodine oxidation after separation of the first solid product. These reactions are adaptable to a water splitting thermochemical cycle in which hydrogen is made by catalytic decomposition of hydrogen iodide at 700 K, and oxygen results from decomposition of the solid product at 1300 K.

30436 **(LA-UR—84-232) Use of oxides in thermochemical water-splitting cycles for solar heat sources. Copper oxides.** Jones, W.M.; Bowman, M.G. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 10p. (CONF-840702—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84006026.

From 5. world hydrogen energy conference; Toronto, Canada (15 Jul 1984).

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Several oxides can be decomposed to oxygen and a lower oxide at temperatures that might be feasible with a solar heat source. Heat might be directly transmitted to the solid through an air window, rather than quartz, with release of oxygen to the atmosphere. The cycle utilizing CuO, I_2, and Mg $(OH)_2$ is similar to the previous Co_3O_4 - CoO cycle. We are concentrating on the reformation of CuO. At 448 K the rate is favorable; for example, the yield rises about linearly with time to 92% at 1.17 h and more slowly thereafter. The only difficulty is the formation of CuI as a metastable intermediate. The oxidation of CuI is thermodynamically very favorable, but its rate limits completion. Excess $Mg(OH)_2$ appears to increase the rate but not to the point where IO_3^- oxidation of CuI competes with oxidation of Cu_2O. Nevertheless, the batch runs suggest that about 98% of the maximum possible MgI_2 could be formed. Cuprous iodide complexes formed in the concentrated MgI_2 may give the necessary improvement by providing a solution path for their oxidation by iodate. Work of others pertaining to the cycle is briefly discussed.

30437 **(LA-UR—84-232-Rev.) Use of oxides in thermochemical water-splitting cycles for solar heat sources. Copper oxides. Revision.** Jones, W.M.; Bowman, M.G. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 10p. (CONF-840702—1-Rev.). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84007496.

From 5. world hydrogen energy conference; Toronto, Canada (15 Jul 1984).

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Several oxides can be decomposed to oxygen and a lower oxide at temperatures that might be feasible with a solar heat source. Heat might be directly transmitted to the solid through an air window, rather than quartz, with release of oxygen to the atmosphere. The cycle involving CuO, I_2, and $Mg(OH)_2$ is similar to the previous Co_3O_4-CoO cycle. The difficulty is the formation of CuI as a metastable intermediate. The oxidation of CuI is thermodynamically very favorable, but its rate limits completion. Excess $Mg(OH)_2$ appears to increase the rate but not to the point where IO_3^- oxidation of CuI competes with oxidation of Cu_2O. Nevertheless, the batch runs suggest that about 98% of the maximum possible MgI_2 could be formed in the cycle reaction. Cuprous iodide complexes formed in the concentrated MgI_2 may give the necessary improvement by providing a solution path for their oxidation by iodate. Work of others pertaining to the cycle is briefly discussed.

30438 **(LBL—17623) Catalyzed photodissociation of water.** Somorjai, G.A.; Hendewerk, M.; Turner, J.E. (Lawrence Berkeley Lab., CA (USA)). Jan 1984. Contract AC03-76SF00098. 43p. (CONF-840102—1). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012253.

From 2. Berkeley catalysis and surface science conference; Berkeley, CA, USA (11 Jan 1984).

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The dissociation of water to hydrogen and oxygen requires energy of $\Delta G_{298} = 228$ kJ/mole. By irradiating a semiconductor with light of energy greater than this amount, one may produce electrons in the excited state and electron vacancies at the surface that can perform the photochemical reduction ($2H^+ + 2e^- \rightarrow 2H \rightarrow H_2$) and oxidation ($2OH^- + 2+ \rightarrow H_2O_2 \rightarrow H_2O + (1/2)O_2$). There are several semiconductors, $SrTiO_3$, TiO_2, CdS, and Fe_2O_3 among them, that can photodissociate water. Some possess sites for both reduction and oxidation, while others carry out the two processes at different surfaces. A reversible solid state reaction that involves changes in the transition metal and ion oxidation state must accompany the splitting of water. Platinum, rhodium, and ruthenium oxide, when deposited on the semiconductor, serve as catalysts that accelerate the water photodissociation. These additives accelerate the recombination of hydrogen and oxygen atoms, shift the semiconductor Fermi level to a more favorable position that improves the thermodynamic feasibility for the process, accelerate electron transport, and inhibit side reactions like the photoreduction of oxygen. Many of the elementary reaction steps leading to photoproduction of hydrogen and oxygen over $SrTiO_3$ abd Fe_2O_3 have been identified and are discussed.

30439 (SERI/TR—231-2159, pp 68-91) **Photo/biological hydrogen subprogram.** Feb 1984. NTIS, PC A06/MF A01. Order Number TI84004487.

In SERI Biomass Program. FY 1983 annual report.

Research has aimed at improving the efficiency of conversion of light to hydrogen energy. Hundreds of microorganisms have been screened for hydrogen production capacity, and a number of promising strains have been selected. The biochemistry and biophysics of hydrogen production by these selected organisms is being studied. Detailed information concerning the biological mechanisms of hydrogen production is being used to plan and execute genetic engineering aimed at producing hydrogen-evolving superbugs. The culture requirements for maintaining maximum hydrogen production rates are being determined both in the laboratory and in the field. Progress toward the research goal of achieving at

least a 10% efficiency of conversion of light to hydrogen energy in whole-cell systems has been encouraging (laboratory-scale experiments with photosynthetic bacteria yielded an efficiency of 5 to 6%). Therefore, researchers have begun devising a conceptual engineering system for hydrogen production. A preliminary system flow has been developed, and components for the system have been identified. Researchers are developing a computer program to model system behavior which is now two-thirds completed. 13 figures, 5 tables.

0802 Storage

REFER ALSO TO CITATION(S) 30433

30440 **(SAND—83-1054) Interaction of thin erbium films with aluminum.** Harris, J.M.; Boespflug, E.P.; Holloway, D.M.; Provo, J.L. (Sandia National Labs., Albuquerque, NM (USA); General Electric Co., St. Petersburg, FL (USA). Neutron Devices Dept.). Jun 1984. Contract AC04-76DP00789. 11p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84013312.

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Aluminum is a potential substrate to support thin erbium films used for high-temperature, hydrogen isotope storage. Both aluminum and erbium are reactive metals, and the interaction of the two could make for an unstable combination at elevated temperatures. Experiments designed to investigate the formation of intermetallic compounds between aluminum substrates and vacuum deposited erbium films are reported. Compound formation was detected at temperatures as low as 275°C. The end product, $ErAl_3$, resulted when the reaction was allowed to continue until all the erbium was consumed. The presence of deuterium bound into the erbium thin film does not prevent the erbium-aluminum reaction. However, anodizing the aluminum substrate prior to the erbium deposition does prevent interactions at temperatures of 500°C for one hour.

09 OTHER SYNTHETIC AND NATURAL FUELS

REFER ALSO TO CITATION(S) 30588

0901 Hydrocarbon Fuels

REFER ALSO TO CITATION(S) 30235, 30478

30441 **(AD-A—136663/2) Properties of fuels employed in a gas turbine combustor program. Technical note.** Coleman, J.R.; Gallop, L.D. (Defence Research Establishment, Ottawa, Ontario (Canada)). Sep 1983. 20p. (DREO-TN—82-42). NTIS, PC A02/MF A01.

Abstract in French.

A compilation has been made of the physical and chemical properties of sixteen fuels employed in an aircraft gas turbine combustor programme. Several of these are specification fuels of the kerosene or wide-cut type. Others have been chosen to exhibit systematic variations mainly in the direction of out-of-specification boiling range or aromatics level or both. Some are of non-petroleum origin, derived from oil shale or tar sands, or are synthetic fuels (JP10, RJ6). Complete specification testing was conducted on these fuels, and detailed non-specification property determination-simulated distillation by gas chromatography, thermal stability breakpoint, density, specific heat, viscosity, surface tension and true vapor pressure, all as a function of temperature; heats of combustion, hydrogen content, and detailed hydrocarbon compositional analysis.

30442 **(BNL—34460) Characterization of the products and comparison of the product yields from the flash pyrolysis of fir wood in hydrogen and helium.** Sundaram, M.S.; Steinberg, M.; Fallon, P.T. (Brookhaven National Lab., Upton, NY (USA)). Jan 1984. Contract AC02-76CH00016. 24p. (CONF-840111—7). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011544.

From 8. annual symposium on energy from biomass and wastes; Lake Buena Vista, FL, USA (30 Jan 1984).

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A seasoned sawdust of Douglas Fir wood was flash pyrolyzed in an entrained tubular reactor in the presence of hydrogen and helium at short residence times (less than 4 sec) at temperatures varying from 600° to 1000°C and pressures of 50 to 500 psi. A significant quantity of gaseous and liquid hydrocarbons and CO were produced. The liquid products were characterized via GC/MS and Pyrolysis Mass Spectrometry. The composition of the liquid products and the influence of the processing conditions on the product yields are discussed. 2 references, 13 figures, 2 tables.

30443 **(CONF-8105169—) Proceedings of the DOE contractors' conference on indirect liquefaction.** (USDOE Pittsburgh Energy Technology Center, PA). 1981. 391p. NTIS, PC A17/MF A01; 1; GPO Dep. Order Number DE84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

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The DOE contractors' conference on indirect liquefaction was held May 20-21, 1981, at Pittsburgh, Pennsylvania. Thirteen papers from the proceedings have been entered individually into EDB and ERA; one paper had been entered previously from other sources. (LTN)

30444 (CONF-8105169—, pp 3.1-3.31) **Comparison of iron Fischer-Tropsch catalysts using on-line gas chromatography.** Diffenbach, R.A.; Schehl, R.R.; Fauth, D.J. 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

Iron-based Fischer-Tropsch (F-T) catalysts could well play an important role in the conversion of lean syngas mixtures ($H_2/CO < 1$) to liquid fuels in a liquid phase reactor. While a tremendous amount of data concerning catalyst performance has been accumulated over the past 50 years, seldom have Fischer-Tropsch catalysts been tested under identical reaction conditions; therefore a meaningful comparison of catalyst activity and selectivity could not be made. Such data are important in order to select a catalyst that will yield a given product slate. In particular, attention will be given to determining which catalyst would be most effective in maximizing gasoline selectivity in a slurry reactor. The problems encountered in testing catalysts used for syngas conversion are well documented and are described only briefly here. Quantitative recovery of a small amount of product is difficult. Exacerbating the recovery problem is the fact that light gases dissolved in the liquid product are flashed off whenever liquid samples are taken. Thes product recovery problems can be largely circumvented by the use of an on-line gas chromatographic analysis. A schematic of the combined reactor - G.C. (gas chromatograph) is shown in Figure 1. The reactor was a 0.0095-m diameter stainless steel tube mounted vertically above the G.C. and connected to the sample valves of the G.C. by a heated transfer line.

30445 (CONF-8105169—, pp 5.1-5.20) **Syngas conversion to gasoline range hydrocarbons using metal-zeolite catalysts.** Rao, V.U.S. 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

It was concluded that: (1) Zeolite acidity plays an important role in the formation of aromatics from synthesis gas by bifunctional catalysts as strikingly evidenced in a comparison of the product slates from ZSM-5 (14.1% Fe) and silicalite (13.6% Fe). (2) Silicalite impregnated with Fe and promoted with K has an exceptionally high selectivity for the production of C_2 to C_4 olefins from synthesis gas. (3) The transition metal component impregnated into the zeolite plays an important role in selectivity as seen from the ZSM-5 (Fe-CO). In this context, zeolites containing bimetallic clusters are of special interest. (4) Medium pore zeolite NU-1 appears to be a promising support with shape selective and moderately acidic properties. NU-1 (Fe) yields gasoline range hydrocarbons whose octane number can be increased by addition of H-mordenite to the catalyst. 4 references.

30446 (CONF-8105169—, pp 6.1-6.12) **Particle synthesis and properties of zeolite catalysts for synthesis gas-gasoline conversion.** Sand, L.B. (Worcester Polytechnic Inst., MA). 1981. NTIS, PC A17/MF A01. Order Number TI84005787. Contract FG22-81PC40773.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

The objective of this project is to form strong particles of zeolite ZSM-5 varieties and other zeolites by direct synthesis techniques, to modify them by ion exchange and thermal treatments for synthesis gas-gasoline and for methanol-gasoline conversions, and to obtain adsorption and catalytic activities as a function of crystal chemistry, morphology, and modifications. This paper reports on previous work in our laboratories relevant to the project objectives. The parameters, approach, and special problems are summarized on the attached sheets. The first plate of scanning electron micrographs shows the effect of silica reactant source and anion on the morphology of ZSM-5 crystals. The second plate shows the growth of uniform 100μm crystals in large precursor gel particles. Equipment is being acquired to scale up the syntheses of larger batches of the larger crystals produced in various systems to evaluate catalytic activity as a function of the material parameters.

30447 (CONF-8105169—, pp 7.1-7.7) **Development of catalysts for the direct synthesis of liquid hydrocarbon fuels (LHF) from syngas.** Eschenbach, R.C. (Unin Carbide Corp., Tarrytown, NY). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

The author's concept for bifunctional catalysts involves transition elements or compounds for C-C formation and molecular sieves for specificity and limiting molecular size. They plan to prepare and test various catalysts prepared with these basic concepts. They also plan to build equipment for surface studies of the catalysts and for study of reaction intermediates as a basis for understanding the reaction mechanism and catalyst performance. (LTN)

30448 (CONF-8105169—, pp 9.1-9.65) **Mathematically modeled comparison of Fischer-Tropsch reactor systems.** Thompson, G.J.; Vickers, A.G.; Pujado, P.R. (UOP Inc., Des Plaines, IL). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

1. A mathematical mechanism has been developed which, when incorporated into models of three completely different reactor systems operating at completely different operating conditions with Fischer-Tropsch catalysts of different manufacture, gives reasonably good agreement on important rate constants derived from the experimental data published for these systems. 2. The mechanism, as demonstrated for potassium promoted catalyst, allows interpretation of yield differences resulting from different catalyst formulations. 3. The reactor models can be used to evaluate existing conceptual designs not only in terms of gross product yield but also in terms of reactor design and operating conditions. 4. The entrained bed reactor lacks the operating flexibility of the tube-wall and slurry reactor systems. 5. In the entrained bed reactor, catalyst circulation rate can be used as an operating parameter to adjust catalyst density within the reactor: increased catalyst density increases CO conversion without significantly influencing the gross product yields. 6. The influence of mass transfer on the CO conversion and degree of polymerization in the Koelbel slurry reactor is small. 7. At the operating conditions proposed in the literature, the slurry reactor will inherently have a higher thermal efficiency than the entrained bed or tube-wall reactors, because of the more efficient use of the water-gas shift reaction. 8. Of all operating parameters (excluding catalyst), temperature has the strongest influence on gross product yields. 9. The sensitivity of product yields to temperature is best utilized in the ulurry reactor. Its three-phase nature allows the production of liquid product at low temperatures. 10. Next to temperature, the largest influence on product yield is the relative concentration of H_2 and CO. 22 references, 14 figures, 15 tables.

30449 (CONF-8105169—, pp 10.1-10.23) **Catalyst and reactor development for a slurry-phase Fischer-Tropsch process.** Dyer, P.N. (Air Products and Chemicals, Inc., Allentown, PA). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

The objective of this work is to evaluate catalysts and slurry reactor systems for the conversion of synthesis gas into transportation fuels, such as gasoline and/or diesel fuels, via a single stage liquid phase process. Included in this is the development of slurry phase catalysts and the study of the hydrodynamics of a three phase slurry reactor using cold flow modeling techniques. The important points in developing and optimizing a slurry catalyst and obtaining high product selectivity can be summarized: (1) It appears to be essential to obtain a uniform and stable metal particle size on a supported type catalyst, whether the support be a conventional metal or a zeolitic support. (2) Shape selectivity and diffusional control imposed by zeolitic type supports is another general method of controlling product selectivity. (3) Support metal interactions, particularly significant in the supported metal cluster type catalysts, have significant effects on product yields. (4) Calcination and activation procedures can also fundamentally affect the properties and appear to influence the product selectivity. Some of the potential advantages of operating Fischer-Tropsch synthesis in the slurry phase are listed: (1) Better heat transfer coefficients possible with operation in the slurry phase, leading to better control of the exothermic reaction and enabling high conversions per pass to be achieved. (2) Ability to use CO rich syngas, such as the 2:1 CO/H_2 ratios produced from second generation coal gasifiers. These advantages should result in a reduction in the yield of methane and enable better control to be achieved over the total product selectivity. 6 references.

30450 (CONF-8105169—, pp 11.1-11.19) **Fischer-Tropsch catalyst characterization.** Massoth, F.E. (Univ. of Utah, Salt Lake City). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

This project has been concerned with the selective production of C_2 to C_4 olefins from synthesis gas using unsupported iron-manganese dioxide catalysts prepared by co-impregnation and activated in H_2 at 500°C. One phase of the project involved a detailed examination of catalyst properties in an attempt to relate them to catalyst selectivity: x-ray diffraction, BET surface area, chemisorption of CO and O_2, programmed desorption, etc. (LTN)

30451 (CONF-8105169—, pp 12.1-12.16) **Usefulness of a slurry-type Fischer-Tropsch reactor for processing synthesis gas of low hydrogen-carbon monoxide ratios.** Satterfield, C.N; Huff, G.A. Jr. (Massachusetts Inst. of Tech., Cambridge). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

Shinnar, using thermal efficiency as a guideline to estimate process economics, concludes that the lowest cost synthesis gas can be produced from certain second generation gasifiers that use minimum amounts of oxygen and steam. The gas thus produced would have a H_2/CO ratio less than 1.0 and possibly as low as 0.5. Conventional Fischer-Tropsch or methanol synthesis processes cannot, however, accept such low H_2/CO ratios. Conversion to methanol requires a H_2/CO feed ratio of 1.8 or 6.0 for fixed- or entrained-bed reactors, respectively. In general, H_2/CO ratios less than about one are considered to be incompatible with long-term, vapor-phase Fischer-Tropsch operation because of excessively rapid carbon deposition. On the other hand, Koelbel et al. reported apparently satisfactory operation of a large slurry reactor using an iron catalyst with a H_2/CO ratio of 0.67. Detailed information on catalyst lifetime was not given but it appears to have been substantial. We propose here that the capability of a slurry reactor to process low H_2/CO gases is probably caused by the mixing pattern characteristic of such systems, together with the use of catalysts that can cause the water-gas-shift reaction to occur simultaneously with the synthesis reaction. 12 references, 3 figures.

30452 (CONF-8105169—, pp 13.1-13.28) **Two-stage slurry Fischer-Tropsch ZSM-5 process of converting syngas to high octane gasoline.** Kuo, J.C. (Mobil Research and Development Corp., Paulsboro, NJ). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

The overall objective of this contract is to develop a two-stage slurry F-T/ZSM-5 process for direct conversion of syngas to high octane gasoline. Specific tasks are the design, construction, and operation of a two-stage, bench-scale pilot plant, and the acquisition of necessary process information for the evaluation of the technical and economic potential of the process. A simplified flowsheet for this process concept is shown. The syngas will be fed into a slurry F-T reactor, and the total product will go to the second-stage ZSM-5 reactor. The products from the ZSM-5 reactor will contain unconverted H_2 and CO, CO_2, some C_3 and C_4, and high octane gasoline. A preliminary mathematical model of a slurry F-T bubble-column reactor is being developed. Both the design of the BSU and the mathematical model are described in this paper. Good reactor temperature control is the most important feature of a slurry reactor. Since the rate of the carbon formation due to the Boudouard reaction $2\ CO \rightarrow C + CO_2$ increases drastically with catalyst temperature, good temperature control will minimize carbon formation on the catalyst and improve long-term catalyst stability. With lower carbon formation, one can afford to use low H_2/CO ratio syngas, as opposed to these used in the conventional vapor-phase F-T processes. This is an important advantage since it avoids substantial costs associated with the shifting of a low H_2/CO syngas to a high H_2/CO one. Good temperature control of the rector with a low H_2/CO ratio syngas will also reduce the methane and ethane yields (low value products). Other advantages are high single pass syngas conversion, efficient recovery of reaction heat and high toleration of carbon formation and catalyst disintegration.

30453 (CONF-8105169—, pp 14.1-14.26) **Investigation of sulfur-tolerant catalysts for selective synthesis of hydrocarbon liquids from coal-derived gases.** Rankin, J.L. (Brigham Young Univ., Orem, UT). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

Some major observations and conclusions based on the 15 catalysts prepared to date are summarized here. From adsorption studies, it is evident that iron and cobalt on silica have relatively poor dispersions in the range of 2 to 10%, though cobalt catalysts are generally more highly dispersed. A 36-hour reduction in H_2 of these catalysts was found to be adequate to achieve near maximum reduction to the metallic state. We have observed that CO/H adsorption ratios on iron/silica are near 1, ranging from 0.7 to 1. This is a completely new observation, we believe. Potassium promotion of the iron lowers this ratio to 0.2. On the other hand, CO/H ratios for cobalt are near 0.5. Experiments with CO_2 chemisorption have shown that K_2O is concentrated on the catalyst surface to as much as 25 to 30 times its bulk concentration. From atmospheric reactor tests of eight supported catalysts in our microreactor system, the following conclusions may be drawn: At atmospheric pressure, cobalt produces a higher molecular weight product than iron; decreasing H_2/CO ratio causes the average molecular weight of the hydrocarbons to increase by reducing the methane yield; iron catalysts produce alcohols, olefins, and large amounts of ethane relative to cobalt catalysts; potassium promotion of iron/silica shifts carbon numbers to higher molecular weights at the expense of C_1 to C_2 production; and significant differences in selectivity are observed in iron-silica catalysts due to differences in state of reduction, and are evidence of metal-support interactions affecting selectivity. 3 references, 17 figures.

30454 **(DOE/CS/84002—T1) Pyrolysis and gasification kinetics of densified biomass. Final report.** Graboski, M.S. (Colorado School of Mines, Golden (USA)). 1983. Contract FG02-80CS84002. 451p. NTIS, PC A20/MF A01; 1; GPO Dep. Order Number DE84009852.

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The results of an ongoing comprehensive study of the effects of densification on the properties of biomass as related to gasification are summarized. The resulting data can be used to build a comprehensive model for gasification considering the importance of various types of heat and mass transfer resistances present. The first chapter describes the results of a study of the pyrolysis kinetics of biomass pellets and presents a model which is useful for predicting the time of pyrolysis as a function of temperature and particle size. Data on char make and composition are presented. Chapter 2 presents the results of a comprehensive kinetic study on chars in carbon dioxide atmospheres. The results show, in the range of temperatures normally encountered in fixed bed gasifiers, that particle size has no significant effect on the rate of char gasification. A kinetic correlation is presented. Chapter 3 summarizes the results of studies pertaining to the effect of gasification on the mechanical properties of chars. 49 references, 30 figures, 25 tables.

30455 **(DOE/ER/10684—T2) Methanogenesis from acetate, a key intermediate in nature. Annual progress report, 1983-1984.** Mah, R.A.; Boone, D.R. (California Univ., Los Angeles (USA). School of Public Health). 1984. Contract AT03-80ER10684. 5p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012145.

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Samples of anaerobic sediments were collected for inoculation of enrichment cultures. Although we have not yet obtained axenic isolates of methanogens from this batch of samples, culture attempts are in progress on enrichments containing organisms of unusual morphology or physiology. Epifluorescence of methanogenic bacteria was used to identify methanogens in enrichment cultures and gave presumptive evidence of whether mixed cultures contained methanogens of unusual morphology.

30456 **(DOE/PC/40771—11) Fischer-Tropsch synthesis in slurry reactor systems. Quarterly report, November 1, 1983-January 31, 1984.** Satterfield, C.N.; Bartos, T.; Hanlon, R.; Matsumoto, D.; Stenger, H. (Massachusetts Inst. of Tech., Cambridge (USA)). 1984. Contract FG22-81PC40771. 26p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84006652.

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We have now completed and partially analyzed a series of studies on the effects of the nature of the liquid present on activity and seletivity of the Fischer-Tropsch synthesis, and the effects of partial poisoning of the catalyst by H_2S or dibenzothiophene (DBT). We discovered that the presence of a small amount of DBT (97.8 mg S per g of Fe in the catalyst) cut methane formation nearly in half under a set of reaction conditions of commercial importance (263°C, 1.48 MPa, H_2/CO feed ratio = 0.69). The selectivity remained constant for at least 200 hours. This is a very important finding since reduction of methane formation is highly desirable. The catalyst activity simultaneously dropped ten-fold but it should be possible to compensate for this in other ways at least in part such as by operation at higher pressure and/or temperature. Alternately, it may develop that lesser levels of catalyst poisoning may be nearly as effective with less loss of activity. These effects are not observed with H_2S. As far as we know the effects caused by DBT are brand new and have not been observed before. We plan to exploit this lead in several ways, including optimization of DBT level and reaction conditions; study of other heterocyclic sulfur compounds, effects of activation procedures and correlation of methane selectivity with catalyst carbiding as determined by Mossbauer spectroscopy. Also of some importance was the observation that operation in the presence of an aromatic liquid (phenanthrene) increased the rate of reaction by a factor of 1.5 to 1.8, everything else being held constant.

30457 **(DOE/PC/40774—T1) Site activities of zeolite-support Ru for CO hydrogenation. Final report.** Goodwin, J.G. Jr. (Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering). 1 Oct 1983. Contract FG22-81PC40774. 220p. NTIS, PC A10/MF A01; GPO Dep. Order Number DE84002414.

The work supported by this grant can be grouped under three headings: a comprehensive study of RuY, Ru supported on zeolites having a range of Si/Al values, and alkali promotion of Ru. NaY-supported Ru catalysts have been prepared by incipient-wet-

ness (I.W.) [using $RuCl_3$], ion-exchange (I.E.) [using $Ru(NH_3)_6Cl_3$], and vapor-impregnation (V.I.) [using $Ru_3(CO)_{12}$]. The resulting catalysts were extensively studied by chemisorption, atomic absorption, IR, ESCA, and catalytic reaction (especially F-T). Significant differences were found depending on the method of preparation. These differences were exhibited in both the physical and chemical characteristics of the catalysts. By variation of the preparation method and Si/Al ratio of the zeolite it is possible to develop a better understanding of how metal particle size and location, metal-zeolite interactions, neutralizing cation type and concentration, and the presence of zeolite acid sites can influence the catalytic properties of the supported metal. Ten papers are included in this final report and are grouped under the following headings: (1) chemisorption characteristics; (2) electronic state of Ru; (3) hydrogenolysis properties of NaY-supported Ru; and (4) Fischer-Tropsch synthesis. All papers have been processed for inclusion in the Energy Data Base.

30458 (DOE/PC/40774—T1, pp 27-36) **Particle size dependence for CO chemisorption on supported Ru catalysts.** Yang, C.H.; Goodwin, J.G. Jr. 1 Oct 1983. NTIS, PC A10/MF A01. Order Number TI84002414.

In Site activities of zeolite-supported Ru for CO hydrogenation. Final report.

The stoichiometry of CO chemisorption on highly dispersed zeolite-supported Ru has been investigated. This stoichiometry, which can be expressed as CO/H, increases with decreasing Ru particle diameter. For diameters < 1.6 nm this ratio approached a limiting value of 4 to 5, indicating the formation of surface carbonyls. No direct influence of the support on this ratio could be detected. 9 references, 3 figures, 1 table.

30459 (DOE/PC/40774—T1, pp 37-55) **Hydrogen chemisorption suppression in Ru-zeolite catalysts.** Wang, H.T.; Chen, Y.W.; Goodwin, J.G. Jr. 1 Oct 1983. NTIS, PC A10/MF A01. Order Number TI84002414.

In Site activities of zeolite-supported Ru for CO hydrogenation. Final report.

Ru catalysts prepared using NaX, NaY, KL and NaMordenite as supports have been characterized by H_2 and CO chemisorption. Significant suppression of hydrogen chemisorption was found for the ion-exchanged catalysts as the Si/Al ratio of the zeolite support increased. Chemical interactions between the metal and the support are considered the main cause of this hydrogen chemisorption suppression. It is suggested that the acidic hydroxyl groups are involved in these interactions. These interactions are greatly affected by method of preparation and metal loading. 28 references, 4 figures, 1 table.

30460 (DOE/PC/40774—T1, pp 56-86) **Electronic properties of Ru in Y zeolites as determined by ESCA.** Shyu, J.Z.; Hercules, D.M.; Goodwin, J.G. Jr. 1 Oct 1983. NTIS, PC A10/MF A01. Order Number TI84002414.

In Site activities of zeolite-supported Ru for CO hydrogenation. Final report.

An investigation by ESCA was made of Ru supported in NaY zeolite. Catalysts were prepared by incipient wetness, vapor impregnation by $Ru_3(CO)_{12}$, and ion-exchange. In addition, a RuHY catalyst was prepared by ion-exchange with NH_4Y. It was found that the Ru 3p/sub 3/2/ band was more sensitive to the state of Ru in the zeolite than the Ru 3d/sub 5/2/ band that is often used in ESCA studies. This greater sensitivity is probably related to a final state configuration interaction of the Ru 3p electrons with the valence 4d electrons. The results from the Ru 3p/sub 3/2/ band were in excellent agreement with previous IR results. 32 references, 3 figures, 4 tables.

30461 (DOE/PC/40774—T1, pp 87-104) **Structure and properties of zeolite-supported $Ru_3(CO)_{12}$ catalysts.** Fu, L.; Goodwin, J.G. Jr. 1 Oct 1983. NTIS, PC A10/MF A01. Order Number TI84002414.

In Site activities of zeolite-supported Ru for CO hydrogenation. Final report.

An investigation of catalysts linking traditional heterogeneous and traditional homogeneous ones has been carried out. $Ru_3(CO)_{12}$ was supported on NaY Zeolite via vapor impregnation of the support in a partial vacuum. The hydrogenolysis of cyclopropane over NaY-supported $Ru_3(CO)_{12}$ was found to result in the complete decarbonylation of the carbonyl and also to produce a large amount of sintering of the metal even though the overall reaction temperature in the micro-reactor did not exceed 136°C. The zeolite-supported Ru clusters proved to have quite different catalytic properties from Al_2O_3-supported Ru for the hydrogenolysis of cyclopropane to propane and for the hydro-isomerization of 1-butene. In addition, these supported clusters exhibited greater catalyst stability. 29 references, 5 tables.

30462 (DOE/PC/40774—T1, pp 171-189) **Fischer-Tropsch Synthesis over zeolite-supported Ru catalysts derived from $Ru_3(CO)_{12}$.** Chen, Y.W.; Wang, H.T.; Goodwin, J.G. Jr.; Shiflett, W.K. 1 Oct 1983. NTIS, PC A10/MF A01. Order Number TI84002414.

In Site activities of zeolite-supported Ru for CO hydrogenation. Final report.

A set of zeolite-supported Ru catalysts were prepared from $Ru_3(CO)_{12}$ using zeolites NaX, NaY, KL, and NaMordenite. These catalysts were characterized and studied under Fischer-Tropsch conditions in order to determine their unique properties and the effect of the zeolite support. For comparison, a catalyst using SiO_2 as a support was also used. $Ru_3(CO)_{12}$ did not appear to be able to diffuse into NaX. Overall, the best catalyst in terms of high Ru dispersion, low methane, selectivity, and high olefin selectivity was Ru/NaY. The type of zeolite used as the support had a strong effect on methane selectivity. This method of preparation, compared to the ion-exchange method, is much superior in producing low yields of methane and high yields of olefins. 35 references, 3 figures, 3 tables.

30463 (DOE/PC/40774—T1, pp 190-218) **Support effects on CO hydrogenation over Ru/zeolite catalysts.** Chen, Y.W.; Wang, H.T.; Goodwin, J.G. Jr. 1 Oct 1983. NTIS, PC A10/MF A01. Order Number TI84002414.

In Site activities of zeolite-supported Ru for CO hydrogenation. Final report.

Hydrogenation of carbon monoxide at 101.3 kPa has been studied over a series of ion-exchanged Ru catalysts supported on NaX, NaY, KL, NaMordenite, and HY zeolites. The type of zeolite had pronounced effects on the activity and selectivity of the Ru. The specific activity would appear to be related to the dispersion of reduced ruthenium in the zeolite. Methane selectivity, however, seems to be strongly influenced by the type and concentration of alkali cations remaining in the ion-exchanged zeolite. These cations appear to promote chain growth much as traditional alkali promoters would, though perhaps more indirectly. Due to bifunctional properties of the zeolite-supported catalysts, a significant fraction of C_4 was in the form of isobutane. Formation of isobutane seems to be related to either the Si/Al ratio in the zeolites or the concentration of the remaining alkali cations, but not to the OH concentration. In addition, H_2 chemisorption at 25°C was increasingly suppressed as the Si/Al ratio of the zeolite support increased. Both the formation of isobutane and the suppression of H_2 chemisorption may be related to the acid strength of the OH groups present, which is a function of the Si/Al ratio of the zeolite. 36 references, 6 figures, 3 tables.

30464 **(DOE/PC/50791—T3) Fischer-Tropsch synthesis from a low H_2:CO gas in a dry fluidized-bed system. Technical progress report, July 1, 1983-April 30, 1984.** Liu, Y.A.; Squires, A.M. (Virginia Polytechnic Inst. and State Univ., Blacksburg (USA). Dept. of Chemical Engineering). May 1984. Contract FG22-82PC50791. 124p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012075.

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The objective of this project is to experimentally develop and demonstrate a novel dry fluidized-bed reactor system (called heat tray) for Fischer-Tropsch synthesis from a low H_2:CO gas. The new reactor involves conducting catalytic synthesis reactions primarily in a horizontal conveying zone, in which fine particles of iron catalyst are carried in a relatively dilute suspension by a large flow of reacting gas. A secondary reaction zone, in the form of a shallow fluidized bed of catalyst particles, is situated beneath the primary reaction zone. This shallow bed also has immersed hori-

zontal heat-transfer tubes for removing reaction heat. A major thrust of the new reactor development is to prevent carbon deposits from forming on the iron catalyst, which cause deactivation and physical degradation. This is to be achieved by conducting the Fischer-Tropsch synthesis in an unsteady-state mode, particularly by alternately exposing the iron catalyst to a large flow of low H_2:CO gas for a short period of time and to a small flow of H_2-rich gas for a long period of time. During the past ten months, numerous steady-state and unsteady-state Fischer-Tropsch synthesis experiments from a low H_2:CO gas were performed using a computer-controlled vibrofluidized microreactor and gas chromatographic (GC) system. The results have revealed specific directions for design and operational improvements of the microreactor system so as to effectively control the cycling of reactant gases during unsteady-state Fischer-Tropsch synthesis, and several modified microreactor systems have been constructed and tested.

30465 **(DOE/PC/60019—2) Two-stage process for conversion of synthesis gas to high quality transportation fuels. Quarterly report, 1 October-31 December 1983.** Kuo, J.C.W. (Mobil Research and Development Corp., Paulsboro, NJ (USA)). Feb 1984. Contract AC22-83PC60019. 46p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012953.

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The status of the Slurry Fischer-Tropsch two-stage pilot plant and the two tall hot-flow models is described. A new Fischer-Tropsch catalyst was evaluated in a small bubble-column reactor, and the run is detailed in this report. Also, a new device for measuring the particle size distribution of catalyst was tested. Photographs of bubble patterns in the small hot-flow models are presented, qualitatively illustrating the effects of orifice and sintered-metal-plate feed-gas distributors, and the superficial gas velocity. In addition, Fischer-Tropsch reactor-wax from the two-stage BSU was used in the hot-flow studies for the first time, and the results verify that different waxes can behave very differently in similar systems. Finally, a mathematical model was used to evaluate a series of continuous stirred-tank Fischer-Tropsch reactors as an alternative to bubble-column reactors.

30466 **(NP—4770313) Synthesis of hydrocarbons by conversion of methanol on zeolite-catalysts of the ZSM 5 type.** Toerk, U. (Bochum Univ. (Germany, F.R.). Abt. fuer Chemie). 16 Jul 1982. 153p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84770313.

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In the conversion of methanol to hydrocarbons on catalysts of the type H-ZSM 5 the product distribution and its dependence on Si/Al-ratio and reaction conditions was studied. The Si/Al-ratio here was 52, 114 and 462. The reaction temperatures were in the range 310 to 590°C at initial pressures of 90 to 810 mbar. In addition the rate of flow for methanol conversion was also varied from 3 to 100%. An increase in Si/Al ratio led to an increase in yields of short-chain olefins. Increase in pressure led to higher proportions of paraffins and isocyclics. The temperature increase showed the same effect as Si/Al ratio.

30467 **(NP—4770314) Investigations on the deactivation of nickel catalysts and the kinetics of the simultaneous methanation and conversion of CO-rich gases under pressure.** Becker, J. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen). 17 Jul 1982. 123p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84770314.

With 66 refs.

Since the level of carbon monoxide present in synthesis gas in too high for stoichiometric methanation, additional hydrogen is required. This is produced from carbon monoxide and water vapour in a conversion step. Methanation and conversion take place simultaneously on nickel-molybdenum catalysts. The increase in larger nickel crystallites loads to a decrease in activity of these catalysts. The formation of these larger crystallites takes place via nickel tetracarbonyl. The rate of deactivation is studied for a number of catalysts whereby the parameters which are varied are temperature and inlet partial pressure of carbon monoxide and water vapour. These parameters, together with retention time, also serve to determine selectivity for method and carbon dioxide yields.

30468 **(NP—4770315) Investigations on the reaction kinetics for the methanation of carbon monoxide.** Klose, J. (Bochum Univ. (Germany, F.R.). Abt. fuer Chemie). 23 Jul 1982. 216p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE84770315.

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The kinetics of methanation was studied using a nickel/aluminium oxide catalyst at various gas partial pressures and temperatures between 453 and 557 K. A number of model concepts on course of reaction and rate-determining step were taken as a basis and a discrimination of the kinetic models carried out with the and of statistical criteria. The best model proved to be the fast dissociative absorption of carbon monoxide and hydrogen. The rate-determining step is the hydrogenation of bound carbon to form a carbene-like intermediate which, by reaction with two adsorbed hydrogen atoms is further hydrogenated to methane or dimerized to form ethane.

30469 **(NP—4770317) Investigations of the behavior of Fischer-Tropsch-catalysts in synthesis.** Jacobs, J. (Bochum Univ. (Germany, F.R.). Abt. fuer Chemie). 27 Oct 1981. 222p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE84770317.

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The influence of pre-treatment of a given Fischer-Tropsch catalyst of ion/vanadium, caused by reduction and moulding, on activity, selectivity and mechanical stability during synthesis was studied. The dependence of product spectrum on yield and temperature was also established. Furthermore the consequences of a partial poisoning of the catalyst by chlorine in the form of chloroform on activity and selectivity was observed. Poisoning by chlorine led to a decrease in activity. Subsequent reactions of the 1-olefins, namely isomerisation and hydrogenation, were largely suppressed, at the same time the chain length of the products increasing as a consequence of the high temperatures required.

30470 **(NP—4770318) Hydropyrolysis of model hydrocarbons in the gaseous phase.** Lischer, H. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemieingenieurwesen). 23 Jun 1982. 178p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE84770318.

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The dissertation presented here is concerned with the hydropyrolysis in the gaseous phase of model hydrocarbons typical of petroleum. The model substances selected for study were dedecane, hexylbenzene and hexylcyclohexane, i.e. three hydrocarbons of the C-12 fraction. On the one hand their molecular masses are high enough to enable test results to be extrapolated to heavier starting materials, whilst on the other hand the analysis of reaction products remains within manageable limits. In the group of alkyl aromatics, n-propylbenzene, i-propylbenzene and octylbenzene were employed to vary the length and structure of the alkyl side-chain. The influence of reaction temperature, retention time and partial pressure of hydrogen on the rate of reaction and product distribution of hydropyrolysis was studied. Variations were made in temperature from 510 to 710°C, in partial pressure of hydrogen from 19 to 99 bar, and in retention time between 2 and 15 s.

30471 **(NP—4901066) Producer gas: another fuel for motor transport.** (National Research Council, Washington, DC (USA). Board on Science and Technology for International Development). 1983. 108p. NTIS, PC A06/MF A01. Order Number DE84901066.

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Producer gas is generated from solid fuels such as wood, charcoal, coal, peat, and agricultural residues. Although it has been used to power internal combustion engines since their invention, it has been largely overlooked for the past 30 years. During the early 1940s, when petroleum supplies for civilian use ran out in Europe, Asia, and Australia, producer gas was responsible for putting trucks, buses, taxis, tractors, and other vehicles back on the roads, and boats back on the rivers. In 1938 Europe operated about 9000 gas producer buses and trucks, and there were almost none on any

other continent. By 1941, however, about 450,000 vehicles were in operation in all parts of the world, and by 1942 the number had grown to approximately 920,000. Gas producers were then in use not only in land vehicles, but also in boats, barges, and stationary engines. By 1946 more than a million motorized devices around the world operated on producer gas. In Europe and Asia alone, the use of producer gas in the 1940s contributed to saving millions of people from starvation. Basically, producer gas is made when a thin stream of air passes through a bed of glowing coals. The coals may come from the burning of wood, charcoal, coke, coal, peat, or from wastes such as corn cobs, peanut shells, sawdust, bagasse, and paper. The gas is generated in a gasifier - a metal tank with a firebox, a grate, air inlets, and an outlet for the gas produced. It consists of carbon monoxide and hydrogen. In the cylinder of a spark-ignition gasoline engine the gas can be ignited in the usual way with the existing spark plugs. In diesel engines, producer gas by itself will not ignite. However, diesel equipment may be operated on producer gas. The gas is mixed with the combustion air and then a small amount of diesel fuel is injected into the cylinders to provide ignition. This book describes producer gas technology and its history. 41 references.

30472 **(PB—84-148865) Conversion of organic wastes to unleaded, high-octane gasoline.** Diebold, J.P.; Benham, C.B.; Smith, G.D. (Naval Weapons Center, China Lake, CA (USA)). Jan 1984. 132p. NTIS, PC A07/MF A01.

This project has demonstrated the marriage of two diverse technologies previously considered to be unrelated--the pyrolysis of organic wastes and the low-pressure polymerization of low-molecular-weight hydrocarbons to form polymer gasoline. This program comprised the development of a multistep chemical process to convert solid organic materials into a liquid hydrocarbon product consisting primarily of high-octane gasoline. This process selectively pyrolyzes organic wastes to form gases rich in reactive hydrocarbons such as ethylene and propylene. The pyrolysis gases are compressed and purified to result in three gaseous streams: carbon dioxide; by-product fuel gases (hydrogen, methane, and carbon monoxide); and reactive hydrocarbons. This last stream is further compressed and sent to the polymerization reactor where high-octane gasoline is formed.

30473 **(SERI/TR—231-2159) SERI Biomass Program. FY 1983 annual report.** Corder, R.E.; Hill, A.M.; Lindsey, H.; Lowenstein, M.Z.; McIntosh, R.P. (Solar Energy Research Inst., Golden, CO (USA)). Feb 1984. Contract AC02-83CH10093. 115p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84004487.

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This report summarizes the progress and research accomplishments of the SERI Biomass Program during FY 1983. The SERI Biomass Program consists of three elements: Aquatic Species, Anaerobic Digestion, and Photo/Biological Hydrogen. Each element has been indexed separately. 2 references, 44 figures, 22 tables.

30474 (SERI/TR—231-2159, pp 43-67) **Anaerobic digestion subprogram.** Feb 1984. NTIS, PC A06/MF A01. Order Number TI84004487.

In SERI Biomass Program. FY 1983 annual report.

The Anaerobic Digestion subprogram objective is to develop a technology base for anaerobic digestion concepts using cellulosic residues to provide a cost-competitive fuel. This is approached through the study of pretreatment, biological processes, and the refining and development of innovative engineering designs. Pretreatment techniques under investigation include: autohydrolysis with no additives, acid and alkaline hydrolysis at high and low temperatures, and enzymatic hydrolysis of hemicellulosic components. Studies on biological processes focus on the physiology, biochemistry, nutrition and genetics of methanogens; and the physiology and biochemistry of fatty acid utilizers and producers. As part of the engineering design program, continuous culture biomass fermentation, dry fermentation and anaerobic digestion of manures and residues are being studied. 2 references, 5 figures, 5 tables.

30475 **Bacterial levels as a function of operating temperatures at a municipal solid waste anaerobic digestor.** Voorhees, S.A.; Daly, E.L. Jr.; Sengupta, S.; Wong, K.V.; Gerrish, H.P.; Nemerow, N.L. (Univ. of Miami, Coral Gables, FL). pp 125-133 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A study was conducted to determine the effect of digestion temperature on the levels of bacteria routinely monitored in the process streams at a Municipal Solid Waste (MSW) anaerobic digestion facility, located at Pompano Beach, Florida. Levels of bacteria were compared statistically, using the Mann-Whitney U Test, between ambient (20 to 35 C), mesophilic (35 to 45 C) and thermophilic (45 to 60C) temperature ranges. Results indicate that there is a significant die-off of Coliform and Salmonella bacteria between mesophilic and thermophilic digestion temperatures. 10 references, 1 figure, 3 tables.

30476 **Characterization of process streams and the effects of plastic wastes on anaerobic digestion.** Muthuswamy, S.; Nemerow, N.L.; Sengupta, S.; Wong, K.V.; Voorhees, S.; Gerrish, H.P. (Univ. of Miami, Coral Gables, FL). pp 177-190 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The three year average pollutant concentrations found from characterization studies of a municipal solid waste anaerobic digestion facility have been reported and discussed. Gas production in a laboratory pilot anaerobic digestion study was increased by removing plastic waste components. 10 references, 3 figures, 3 tables.

30477 **Biogas recovery from sugarcane wastes.** Dasgupta, A.; Nemerow, N.L. (Univ. of Miami, Coral Gables, FL). pp 295-304 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

In the production of cane sugar, bagasse and cachaza are the two forms of solid waste that are generated. Laboratory scale studies were conducted to examine the potential of anaerobic digestion of cellulose-rich bagasse-cachaza mixture for generating methane gas. Completely mixed batch reactors were operated at loadings between 0.3 to 1.48 lb vs/cft and the results of the experiments are discussed.

30478 **Thermal degradation of cellulose in alkali.** Miller, R.K.; Molton, P.M.; Russell, J.A. (Pacific Northwest Laboratory Richland, Washington). *Alternative Energy Sources;* 3: 347-356(Dec 1980). (CONF-801210—). Contract AC06-76RL01830.

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

Biomass in an alkaline aqueous slurry can be liquefied by heat and pressure. We are interested in better understanding the mechanisms of biomass liquefaction to improve the efficiency of converting biomass to useful products, particularly chemicals and synthetic fuels. To study the chemical mechanisms of this process, we liquefied pure cellulose, the main component of biomass; later we plan to expand our study to include lignin and hemi-cellulose. The 78 cellulose liquefaction products that we have identified by gas chromatography/mass spectrometry include polyols, furans, ketones, hydrocarbons, and aromatic compounds. Polyols may be formed by hydrogenolytic cleavage. Furans and cyclic ketones may be cyclization products of dicarbonyl intermediates formed by aldol condensation of small initial degradation products such as acetone and acrolein. We used several of these small carbonyl compounds as model compounds to test our proposed mechanisms for furans and cyclic ketones and obtained products supporting five of the mechanisms. For the best case of 26 cellulose liquefaction experi-

ments, 34% of the initial mass of the cellulose was converted to acetone-soluble oil with a heat of combustion of 14,000 Btu/lb.

30479 **Transportation fuels from wood.** Baker, E.G.; Elliott, D.C.; Stevens, D.J. (Pacific Northwest Laboratory Richland, Washington). *Alternative Energy Sources;* 3: 363-376(Dec 1980). (CONF-801210—). Contract AC06-76RL01830.

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

The various methods of producing transportation fuels from wood are evaluated in this paper. These methods include direct liquefaction schemes such as hydrolysis/fermentation, pyrolysis, and thermochemical liquefaction. Indirect liquefaction techniques involve gasification followed by liquid fuels synthesis such as methanol synthesis or the Fischer-Tropsch synthesis. The cost of transportation fuels produced by the various methods are compared. In addition, three ongoing programs at Pacific Northwest Laboratory dealing with liquid fuels from wood are described.

30480 **Economics of production of microalgae in high intensity mass culture, as a new source of fuel oils.** Cysewski, G.R.; Anderson, D.B.; Molton, P.M. (Battelle Pacific Northwest Laboratories Battelle Blvd. Richland, Washington). *Alternative Energy Sources;* 3: 399-406(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

Solar energy farming using stands of rapidly growing trees has been suggested as a major source of fuel for the future. Microalgae have generally higher demonstrated production rates than most land biomass up to 50 tons dry weight per acre/yr, for algae, compared to less than 20 tons/acre/yr. for trees. Production at these levels requires capital intensive algal mass culture systems rather than the conventional ponds. Using such an engineered system, algae may be grown under nitrogen-limited conditions to yield lipids in up to 80% of the algal dry weight, at an estimated cost of as low as 20 cents/lb (or about $1.58 per gallon). This lipid has a high energy content (equivalent to sunflower oil) and may be used directly as a diesel fuel. We present experimental data in support of our economic assessment. Microalgae may be a better and more economical source of lipid fuels than land plant biomass.

30481 **Use of catalysts in biomass gasification.** Robertus, R.J.; Mitchell, D.H.; Mudge, L.K.; Sealock, L.J.; Weber, S.L. (Pacific Northwest Laboratory Chemical Technology Department Richland, Washington). *Alternative Energy Sources;* 3: 409-424(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

Methane and methanol synthesis gas can be produced by steam gasification of biomass in the presence of appropriate catalysts. The concept is to use catalysts in a fluidized bed reactor which is heated indirectly. The objective of this study is to determine the technical and economic feasibility of the concept. Technically the concept has been demonstrated on a 50 lb/hr scale. Advantages over conventional processes include: No oxygen plant is needed. Little tar is produced so gas and water treatment are simplified. Yields and efficiencies are greater than obtained by conventional gasification. Economic studies (for utility financing of a 2000 ton/day plant with a 15% return on equity) show a methane cost of $6.50/MM BTU when wood feed costs $20 per dry ton. Similar considerations for methanol production show a cost of $.55 per gal.

0902 Alcohol Fuels

REFER ALSO TO CITATION(S) 30100, 30101, 30443, 30481

30482 **(CEMR-MS—6) Economic feasibility of small-scale ethanol production in Texas.** Bowker, J.M.; Griffin, R.C. (Texas A and M Univ., College Station (USA). Center for Energy and Mineral Resources). Jul 1983. 51p. NTIS, PC A04/MF A01. Order Number DE84901047.

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The average production cost per gallon of 182-proof ethanol from the 9000 gallons per year operation was $4.82, whereas that for the 144,000 gallons per year plant wa $1.74. Per-gallon production costs were reduced nearly 64 percent in the case of the larger plant. Production costs were partitioned into fixed and variable costs. The fixed cost per gallon for the 9000 gallons per year plant is $.190, whereas the 144,000 gallons per year operation has an average fixed cost of $0.19 per gallon. The variable cost per gallon for the 9000 gallons per year plant is $3.14, whereas the variable cost per gallon for the 144,000 gallons per year operation is $1.77. Most of the difference in production costs between the two operations is attributable to labor and plant utilization. The sensitivity of production costs for either plant to changes in key parameters was examined. The parameters included: feedstock price, discount rate, by product value, planning horizon, and labor cost. An imputed value of 182 proof ethanol was determined to assess the profitability of either plant size. The value of ethanol is substantially higher when it is considered as an ingredient in the production of gasoline-alcohol blends as opposed to a direct replacement for petroleum-based fuels. Given the resulting production costs of $4.82 and $1.74 per gallon for the 9000 gallons per year and the 144,000 gallons per year operations respectively, the imputed market value of $1.59 per gallon of 182-proof ethanol indicates that the opportunity for profit does not exist. The economic picture is somewhat brighter for the 144,000 gallons per year plant, although it too fails to be economically feasible. The production cost in this case exceeds potential returns by $0.15 per gallon. However, this difference is somewhat ameliorated by investment tax and depreciation credits. 23 references, 11 tables.

30483 (CONF-8105169—, pp 2.1-2.15) **Status of the 100 B/D fluid-bed methanol-to-gasoline (MTG) project.** Lee, W. (Mobil Research and Development Corp., Paulsboro, NJ). 1981. NTIS, PC A17/MF A01. Order Number TI84005787.

From DOE contractors' conference on indirect liquefaction; Pittsburgh, PA, USA (20 May 1981).

The discovery of a new class of shape selective zeolite catalyst, namely ZSM-5, has provided the basis for an efficient process for converting methanol to high octane gasoline. Recognizing that methanol can be produced from coal and natural gas using well established commercial technology, Mobil undertook the development of the Methanol-to-Gasoline (MTG) Process. It provides the first new route in 40 years for the production of premium transportation fuel from non-petroleum sources. Synthesis gas (CO and H_2) derived from coal by gasification, or from natural gas by steam reforming, is readily synthesized into methanol, which is then converted to mostly gasoline by the MTG Process. The ZSM-5 channel structure permits only molecules of certain sizes to penetrate or exit. Consequently, the reaction products exhibit a high selectivity of gasoline; virtually no molecules with a carbon number higher than ten are produced. MTG reactions are highly exothermic. The heat of reaction is estimated to be about 740 Btu per pound of methanol converted. Unless this heat is promptly removed, the catalyst temperature could rise by as much as 1100°F. Therefore, heat removal was one of the major considerations in the process design. Two modes of operation have been developed: fixed-bed process and fluid-bed process. In the fixed-bed process, the reaction heat is removed by recycle of light gas product, whereas cooling tubes are used in the fluid-bed system. This paper briefly reviews the status of the fluid-bed MTG project which is jointly undertaken by URBK and Uhde, both of Germany, and Mobil. US DOE and German BMFT (our DOE equivalent) provide financial support.

30484 **(IFP—31-574) Modelization of phase equilibria in alcohols-ethylene glycol-water systems. Application to dehydration of synthetic alcohol mixtures by distillation.** Villa Rivera, J.E. (Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison). Sep 1983. 217p. (In French). NTIS (US Sales Only), PC A10/MF A01. Order Number DE84751358.

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Catalytic synthesis of alcohols from CO and H_2, for fuel substitution, produces a mixture rich in methanol and ethanol but also in higher alcohols. The typical composition obtained is methanol 26.8%, ethanol 27.7%, propanols 10.5%, butanols 5.8%, pentanols 6.7%, hexanols 2.5% and water 20%. Miscibility with gasoline requires a maximum water content of 1 wt %. Problems of alcohol-water separation are examined. Liquid-vapor equilibria are studied

experimentally. The extractive distillation process using ethylene glycol is studied for the dehydration of alcohol mixtures.

30485 **Effect of cellobiose, glucose, ethanol, and metal ions on the cellulase enzyme complex of Thermomonospora fusca.** Ferchak, J.D.; Pye, E.K. (Department of Biochemistry and Biophysics, School of Medicine/G3, University of Pennsylvania, Philadelphia, Pennsylvania). *Biotechnology and Bioengineering;* **25**: No. 12, 2865-2872(Dec 1983).

The saccharification of cellulosic substrates by cellulase from Thermomonospora fusca, strain YX, was influenced by the presence of various substances. Cellobiose was strongly inhibitory, reducing the activity against swollen cellulose to 25% at 5% concentration. Glucose had much less effect, reducing activity to 40% at 20% concentration. Ethanol was found to be only slightly inhibitory to the cellulase, reducing activity by about 15% at 6% concentration, but much more inhibitory to the cell-bound B-glucosidase activity. Of the numerous metal ions examined, Ca^{2+} and Co^{2+} at 0.1mμ-1.0mμ concentration were found to be slightly activating under assay conditions, while 1.0mμ Pb^{2+} and Hg^{2+} were the most inhibitory ions. The implications of these results for the design of commercial processes for ethanol production from cellulose are discussed.

30486 **Effect of glucose and other sugars on the β-1,4-glucosidase activity of Thermomonospora fusca.** Ferchak, J.D.; Pye, E.K. (Department of Biochemistry and Biophysics, School of Medicine University of Pennsylvania, Philadelphia, Pennsylvania). *Biotechnology and Bioengineering;* **25**: No. 12, 2855-2864(Dec 1983).

The cell-associated β-glucosidase activity of Thermomonospora fusca, strain YX, showed both PNPGase and cellobiase activities. The cellobiase activity was found by HPLC assay to have very low product inhibition, whereas the PNPGase activity was more significantly inhibited. Of the various sugars and sugar analogs tested for inhibition of the PNPGase activity, gluconolactone had the greatest effect. The low product inhibition of the cellobiase activity was further demonstrated by the production of glucose syrups to 20% concentration from both cellobiose and swollen cellulose (Avicel). This characteristic is of practical importance in the development of a commercial process for the production of glucose syrups from cellulose. Growth experiments gave further evidence for the probability of separate enzymes for the PNPGase and cellobiase activities.

30487 **Hydrolysis of agricultural wastes.** Yin, F.S.; Hwang, A.L.; Yu, N.; Hao, P.L.C. (Union Industrial Research Lab., Taiwan, China). pp 447-456 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The object of this paper is to convert the hemicellulose and cellulose components in rice straw to pentoses and hexoses by a two-stage hydrolysis process. In the first stage, the hemicellulose component of rice straw is quantitatively hydrolyzed to pentoses with 2% sulfuric acid at 110°C. The preliminary cost analysis of a plant processing 15 tons of rice straw per hour shows that the annual profit is very attractive. In the second stage, the cellulose component is hydrolyzed with either a small amount of concentrated sulfuric acid or a crude cellulase extract. About 65% of the cellulose is converted to glucose by either of these two methods.

0904 Solid Waste And Wood Fuels

REFER ALSO TO CITATION(S) 31109, 31111, 31112, 31113, 31118, 31119, 31120, 31122, 31123, 31125

30488 **(TVA/OP/ECR—84/4) Wood-fired boiler test report (stick burner).** (Tennessee Valley Authority, Chattanooga (USA). Div. of Energy Conservation and Rates). Aug 1983. 199p. NTIS, PC A09/MF A01. Order Number DE84900982.

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The Tennessee Valley Authority's (TVA) Commercial and Industrial (C and I) Biomass Project began the wood-fired boiler testing in order to provide efficiency and emission data on a manually fed stickwood boiler. The tests were conducted to TVA at the Energy Use Test Facility (EUTF) in Chattanooga, Tennessee. A system of continuously monitoring electronic analyzers was used in sampling combustion product gases. Sampling included mesuring concentrations of oxygen, carbon monoxide, carbon dioxide, sulfur dioxide, nitrous oxides, water vapor, and total hydrocarbons. A computer analysis program was developed by the EUTF at TVA to calculate the diagnostic efficiencies and emission factors for carbon monoxide, sulfur dioxide, total hydrocarbons, and nitrous oxides. In addition, a modified EPA Method 5 (MM5) sampling system was used to recover integrated samples of stack gas. The samples were analyzed using gas chromatography/mass spectrometry, and gravimetric techniques. The results of the MM5 analysis provided emission factors for total particulates, volatile hydrocarbons, condensible organics, and polynuclear aromatic hydrocarbons. The thermodynamic efficiency for the boiler system considered both the combustion efficiency of the fuel and the heat transfer efficiency through the boiler tubes. The thermodynamic efficiency ranged from 52% when using fuel with a 33% m.c. to 70% when using the 11.2% m.c. fuel. The combustion efficiency, on the other hand, ranged from 85.4% using the 33% m.c. fuel to 96.6% using 11.2% m.c. fuel. The boiler system exceeded the manufacturer's rating of 350,000 Btu an hour when using a fuel with a 11.2% moisture content. However, the system only produced 250,256 Btu an hour and 162,522 Btu an hour when using fuels at 23 and 33% moisture content, respectively. 26 references, 26 figures, 8 tables.

30489 **Ames Solid Waste Recovery System: update.** Joensen, A.W.; Chantland, A.; Hove, M.; Titus, G. (Iowa State Univ., Ames, IA; City of Ames, IA). pp 11-20 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Performance data are presented on a facility for recovering and using refuse derived fuels (RDF) for power production from municipal solid wastes. In addition, metals and papers are recycled at the facility. Economic performance, electrical energy consumption, processing plant down time, and RDF heating values are tabulated for 1980 and 1981. The facility is located in Ames, Iowa. (DMC)

30490 **Technology assessment: municipal solid waste as a utility fuel.** Cymny, G.A.; Naparstek, M.I.; McGowin, C.R.; Freedman, M. (Ebasco Services, Inc., New York, NY; Electric Power Research Inst., Palo Alto, CA; NY State Energy Research & Development Authority, Albany, NY). pp 21-30 of Resource recovery from solid wastes. Sengupta, S., Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

This assessment evaluated the technical and economic aspects of the following five municipal solid waste (MSW)-to-electricity technologies: mass burning of municipal solid waste (MSW) in a dedicated boiler; preparation of coarse refuse derived fuel (RDF) and firing in a dedicated boiler; preparation of wet RDF and firing in a dedicated boiler; preparation of fluff RDF and cofiring with coal in a 500 MWe utility boiler; and preparation of dust RDF and cofiring with coal in 500 MWe utility boiler. In all cases, the generated steam is used to drive a turbine-generator and produce electricity. Utility ownership and financing is assumed for the coal-fired power plant and the turbine-generators driven by the dedicated boiler-generated steam. Municipal ownership is assumed for the RDF preparation facilities and the dedicated boiler plants.

30491 **Air pollution control: an advanced state of the art technology.** Bebchick, L.L. (Teller Environmental Systems, Inc., Shrewsbury, MA). pp 247-264 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Dry scrubbing for simultaneous particulate and acid gas control is gaining prominence as the best available control technology to attain the lowest achievable emission rate on solid waste incineration emissions. A review of the technology with justification for utilization is given as are performance results and case histories of existing installations utilizing this technology. 13 references, 7 figures, 3 tables.

13 HYDRO ENERGY

1303 Plant Design And Operation

30492 **(DOE/ID/12129—T1) Garland canal power project. Final technical and construction cost report.** (Shoshone Irrigation District, Powell, WY (USA)). Mar 1984. Contract FC07-80ID12129. 128p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012492.

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This report describes the major steps undertaken by the Shoshone (Wyoming) Irrigation District to develop a new lowhead hydroelectric generation plant and to demonstrate the economic feasibility of such a plant. This report addresses the process of site selection and conceptual design, licensing and the regulatory process, final design and equipment selection, and project construction. Technical and economic data are presented in this report.

30493 **(DOE/RA/23210—3) James River-New Hampshire Electric, Inc. Sawmill Hydrostation Redevelopment. Final operations and maintenance report.** (James River Corp., Berlin, NH (USA). Engineering Dept.). Apr 1984. Contract FC07-79RA23210. 56p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012195.

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This report has as its objective a presentation of some communication problems, some design problems, problem resolutions, three years of operating statistics, and a financial payback summary. Generation has not been nearly as high as projected, and some equipment problems have caused concern as to usefulness and durability. These problems and their solutions or explanations are discussed herein.

30494 **Advances in the state-of-the-art of small hydropower engineering technology.** McLatchy, M.J. (Energy & Technology Division U.S. Department of Energy Idaho Operations Office Idaho Falls, Idaho). *Alternative Energy Sources;* 4: 399-417(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

During the past three and a half years, over twenty five projects have been sponsored by the U.S. Department of Energy (DOE) Small Scale Hydropower Engineering Development program. Aimed at advancing the state-of-the-art of small hydro engineering technology, these projects are currently in various stages of development, ranging from projects which have been completed for quite some time to projects which are just getting started. From a multitude of proposals, both solicited and unsolicited, DOE has selected the sponsored projects in an endeavor to improve the economic viability of harnessing a significant portion of the nation's small scale hydropower potential. The types of projects undertaken run the gamut from new hydropower equipment development to investigating the use of pumps as turbines to pumped storage to tidal power studies to low cost fish passageways to feasibility assessments of various hydropower schemes to the development of a guide manual for conducting feasibility studies for small scale hydropower additions. This paper briefly reviews the results of already completed DOE small scale hydropower engineering development projects, explores the status of projects currently underway, and examines the prospects for near term future developments.

1304 Regulations And Licensing

REFER ALSO TO CITATION(S) 30493

1306 Environmental Aspects

30495 **(FERC/DEIS—0038-Vol.1) Susitna Hydroelectric Project, FERC No. 7114 - Alaska. Volume 1. Main text. Draft environmental impact statement.** (Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation). May 1984. 358p. NTIS, PC A16/MF A01; 1; GPO Dep. Order Number DE84012090.

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The purpose and need for the action is addressed, including past, present, and future need for power, discussion of Applicant's and Staff's load growth forecasts, range of alternatives examined, economic analysis of alternatives, and Staff's development of various power generation scenarios that represent the range of available and feasible options for meeting the future electric energy demand in the Railbelt region of Alaska. A detailed description of the proposed project and the various alternative power generation scenarios considered in the DEIS (Draft Environmental Impact Statement) is presented. Descriptions of the regional and project-specific environments that could potentially be affected by development of the proposed project or any of the array of alternatives analyzed are given. This section covers land features and uses, climate and air quality, water resources and aquatic communities, plant and animal populations and associations, socioeconomic factors, recreational and visual resources, and archeological and historic sites. The probable environmental impacts that would be likely to occur in the environments described if the Susitna Hydroelectric Project or any of the various alternatives were constructed and operated are described and discussed. In addition to discussion of environmental impacts of each proposed or alternative scenario, this section also covers impacts of the no-action alternative, a comparison of the projected impacts of the various alternatives, relationship of impacts to known resource plans and utilization, impacts that cannot be avoided or mitigated, resources that would be permanently lost, and short-term vs. long-term uses of the environment.

30496 **(FERC/DEIS—0038-Vol.2) Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 2. Appendices A through D. Draft environmental impact statement.** (Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation). May 1984. 56p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012089.

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The following appendices are included: (A) Load Growth Forecast: The Alaska Power Authority Forecasts; (B) Future Energy Resources; (C) Energy Conservation; and (D) 345-kV Transmission Line Electrical Environmental Effects. (MHR)

30497 **(FERC/DEIS—0038-Vol.3) Sustina hydroelectric project, FERC No. 7114 - Alaska. Volume 3. Appendices E through G. Draft environmental impact statement.** (Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation). May 1984. 145p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012088.

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The following appendices are included: (E) Geology and Soils; (F) Land Use and Ownership; and (F) Climate, Air Quality, and Noise. (MHR)

30498 **(FERC/DEIS—0038-Vol.4) Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 4. Appendices H and I. Draft environmental impact statement.** (Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation). May 1984. 129p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012087.

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The following appendices are included: (H) Water Resources; and (I) Fisheries and Aquatic Resources. (MHR)

30499 **(FERC/DEIS—0038-Vol.5) Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 5. Appendices J and K. Draft environmental impact statement.** (Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation). May 1984. 240p. NTIS, PC A11/MF A01; 1; GPO Dep. Order Number DE84012086.

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The following appendices are included: (J) Terrestrial Botanical Resources; and (K) Terrestrial Wildlife Resources. (MHR)

30500 **(FERC/DEIS—0038-Vol.6) Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 6. Appendices L and M. Draft environmental impact statement.** (Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation). May 1984. 121p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012085.

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The following appendices are included: (L) Recreation Resources; and (M) Visual Resources. (MHR)

30501 **(FERC/DEIS—0038-Vol.7) Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 7. Appendices N and O. Draft environmental impact statement.** (Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation). May 1984. 113p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012084.

Portions are illegible in microfiche products.

The following appendices are included: (N) Socioeconomics and (O) Cultural Resources. (MHR)

30502 **A comparison of environmental issues related to development of small hydropower resources at new versus existing sites.** Loar, J.M.; Hildebrand, S.G. (Environmental Sciences Division Oak Ridge National Laboratory Oak Ridge, Tennessee). *Alternative Energy Sources;* **9**: 279-297(Dec 1980). (CONF-801210—). Contract W-7405-ENG-26.

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

Many of the ecological issues associated with the development of small hydropower resources are similar at both new (undeveloped) sites and those with existing dams that will be retrofitted for hydroelectric generation. Issues that could occur with both types of development are (1) blockage of fish migration routes, (2) water level fluctuations, (3) instream flows, (4) water quality, (5) dredging and dredged material disposal, and (6) threatened or endangered species. However, new site development projects require the alteration of existing aquatic and terrestrial ecosystems that will be, in most cases, significantly greater than the environmental changes associated with the retrofitting of existing dams. Although project design and operation are important factors controlling the nature and magnitude of the environmental impacts of small hydropower resource development, the mitigation of adverse impacts (and the optimization of beneficial effects) is dependent, in large measure, on our ability to accurately predict physical, chemical, and biological changes. Predicting the impacts of new impoundments may be considerably more difficult than predicting the impacts that might occur if an existing dam/impoundment system is developed. A comparative approach at the ecosystem level can provide valuable insights into the structure and function of reservoir systems and significantly increase our predictive capability.

14 SOLAR ENERGY

1401 Resources And Availability

30503 **Thermodynamic limits on conversion of solar energy to work or stored energy--effects of temperature, intensity and atmospheric conditions.** Buhl, M.L.; Bilchak, R.V.; Bird, R.E.; Bolton, J.R.; Connolly, J.S. (Solar Energy Research Inst., Golden, CO). *Solar Energy;* **32**: No. 1, 75-84(1984). Contract AC02-77CH00178.

For more than two decades the subject of thermodynamic limits on conversion of light to work and/or chemical energy via photovoltaic or photochemical processes has been of considerable interest. Three distinct approaches have been taken to the problem; however, all three have recently been shown to be equivalent and to give identical results. Most earlier calculations have been carried out using AMO or AM1.2 solar spectral distributions. In this paper, we use AM1.5 spectra and concentrate primarily on the effects of variation of atmospheric conditions on calculated power-conversion efficiencies. The conditions we examine are: absorber temperature, total solar intensity, air mass, ozone and water-vapor content of the atmosphere, and the turbidity and visibility of the atmosphere. In addition we have computed efficiencies for the diffuse component of global solar radiation as an approximation to turbid conditions. The results are displayed as plots of solar conversion efficiency vs. bandgap wavelength for each set of conditions. Conclusions are then drawn as to the important variants which can serve to guide the design of photochemical and/or photovoltaic systems for a given environment.

30504 **A new look at the correlation of K /SUB d/ and K /SUB t/ ratios and at global solar radiation tilt models using one-minute measurements.** Smietana, P.J.; Flocchini, R.G.; Hatfield, J.L.; Kennedy, R.L. (Bioresearch Inc., San Rafael, CA). *Solar Energy;* **32**: No. 1, 99-107(1984). Contract FG03-77ET20187.

One-minute measurements of horizontal diffuse, D /SUB h/ , and global, G /SUB h/ , solar radiation components were used to calculate K /SUB d/ and these ratios were compared with values determined from previously published functions of the independent parameter K /SUB t/ . The spectrum of the 9906 ratios, used in the comparison, was taken from representative days with percent sunshine ranging from 10 to greater than 90 per cent and from different seasons. The results of this comparison show that K /SUB d/ is not accurately determined by these functions of K /SUB t/ alone and from functions fitted to our data, and suggest that other parameters might be needed. The calculation of global radiation on a tilted surface from models which depend on D /SUB h/ were also analyzed by comparisons with global tilt radiation measured at 45° and 90° tilt angles at each of the four cardinal directions. The poor determination of K /SUB d/ causes large scatter in calculated global tilt radiation values because of the corresponding poor value of D /SUB h/ . However, if a good value of D /SUB h/ is used then the global tilt models replicate measured global tilt radiation values to within 10 per cent.

30505 **A sky radiation-illumination correlation model.** Arumi-Noe, F. (School of Architecture, Univ. of Texas). pp 3-20 of Proceedings of the ASREA/DOE Conference Thermal Performance of the Exteria Envelopes of Buildings II. Atlanta, GA; A.S.H.R.A.E. (1982). (CONF-821217—). Contract AC02-80CS30254.

From ASHRAE/DOE conference on thermal performance of building envelopes; Las Vegas, NV, USA (5 Dec 1982).

A radiation-illumination correlation model was tested successfully for accuracy against empirical data collected by the Daylighting Laboratory of the Solar Energy Research Institute (SERI). The model developed proposes the possibility of a single measured value (e.g., total solar radiation) being sufficient to calculate the direct and diffuse components of radiation as well as the illumination of a surface of arbitrary orientation. The sky radiation model was developed based on an empirical correlation between the two Liu-Jordan parameters. The model automatically weights the contribution from the direct solar beam and from the diffuse visible sky

radiation, without arbitrary assignment of the clear or overcast labels. The illumination on a surface was calculated by multiplying the intercepted radiation by the total luminous efficacy of the sky, obtained from the empirical measurements reported by SERI.

1403 Economics

REFER ALSO TO CITATION(S) 30525, 30526

30506 **(PNL-SA—12261) Photovoltaics industrialization in the world market.** Watts, R.L.; Ferber, R.R. (Pacific Northwest Lab., Richland, WA (USA); Jet Propulsion Lab., Pasadena, CA (USA)). Jun 1984. Contract AC06-76RL01830. 5p. (CONF-840622—12). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011878.

From Annual meeting of the American Solar Energy Society; Anaheim, CA, USA (5 Jun 1984).

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The growth of the photovoltaic industry and the 1983 world market are briefly examined, followed by the market development process. The photovoltaic technologies are described very briefly, followed by a discussion of projected world market development. (LEW)

1404 Environmental, Legal, And Institutional Aspects

REFER ALSO TO CITATION(S) 30588

30507 **(DOE/ET/20209—T1) Survey of small and small disadvantaged businesses in solar technology. Final report.** Feeney, J.; Doud, R.; Ream, A.; Warburton, C. (Systematics General Corp., Falls Church, VA (USA)). Jan 1980. Contract FG01-78ET20209. 215p. NTIS, PC A10/MF A01; GPO Dep. Order Number DE84012196.

The objectives of the Survey were to analyze the technical, managerial and financial capabilities of small and small disadvantaged business (SB/SDB) that may now be participating in Federal Solar Technology Programs or who have some related expertise and sufficient capability such that with some assistance from DST, they can effect a transition into the field. The Survey was composed of two separate but interrelated activities including a telephone survey of forty (40) selected SB/SDB's and a follow up on site interview with twelve (12) selected SB/SDB's to verify and expand upon the data gathered during the telephone interview. With respect to technical capabilities the firms were grouped at either end of the spectrum with either strong capabilities or marginal/capabilities, and their abilities to move from marginal to strong capabilities was a direct function of their ability to obtain solar project experience. It was found, however, that even those firms that demonstrated marginal solar capabilities and project experience had the inherent technical capabilities to transition into a higher level of solar project experience if given the opportunity. The business stability of all of the firms was verified as satisfactory but it was felt that the method of Federal procurement, i.e. small short term projects with significant administrative loads, created severe stability problems for each of the SB/SDBs. The identified were: procurement response time; (2) response requirements; (3) big business syndrome; (4) laboratories syndrome; and standards/specifications.

1405 Solar Energy Conversion

REFER ALSO TO CITATION(S) 30439, 30442, 30454, 30471, 30473, 30474, 30477, 30478, 30479, 30480, 30481, 30485, 30486, 30487, 30506, 30567, 30588, 31043, 31050, 31109, 31124, 31127, 31133, 31254, 31453

30508 **(BMFT-FB-T—83-309) Research and development on the encapsulation of solar cells with improved potting and cover materials.** Gruber, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 96p. (In German). NTIS (US Sales Only), PC A05. Order Number DE84751247.

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Encapsulations materials for a full-plastic-panel consisting of a scratch resistant coated PMMA-cover, an acrylic pottant, a PMMA-substrate and an acrylic sealant were optimized. The main problems of inhibition of the redox-initiation-system, of adhesion between pottant and cover plates, and of water take up by the pottant could be solved. The optical properties of panels were improved by scratch resistant coating and by applying a diffusely reflecting substrate. Only 60°C could be reached as a longterm service temperature, tests about practical weathering conditions are made.

30509 **(DOE/CS/83116—T1) Studies of hydrogenated amorphous silicon. Yearly report, 15 August 1982-15 March 1984.** Carlos, W.E. (Naval Research Lab., Washington, DC (USA)). 1984. Contract AI02-80CS83116. 22p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011888.

As in the case of crystalline semiconductors, the incorporation of group III elements such as boron into hydrogenated amorphous silicon (a-Si:H) produces p-type doping. Unlike the crystalline case, the doping efficiency in a-Si:H is quite low and therefore relatively large amounts of boron must be incorporated into the a-Si:H to achieve the desired results. One major purpose of the present contract is therefore to characterize the local structural environment of boron using NMR. A second significant problem addressed during the past year has been the role of intrinsic and extrinsic defects in these films. For this work ESR has been the primary probe and in the past year films grown by both glow discharge and CVD have been studied. A final objective of the present work has been to study dopants in microcrystalline films with an eye to learning what fraction of the dopant atoms (phosphorous or boron) reside in the microcrystals and what fraction reside in the amorphous matrix.

30510 **(DOE/ET/20590—T1) Feasibility of using municipal wastewater and waste heat to maximize biomass production in energy plantations. Annual progress report, May 15, 1978-March 1, 1981.** Sopper, W.E.; DeWalle, D.R.; Kerr, S.N. (Pennsylvania State Univ., University Park (USA). Inst. for Research on Land and Water Resources). 1981. Contract FG01-78ET20590. 127p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012198.

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The feasibility of increasing woody biomass production from forest energy plantations through the use of municipal wastewater irrigation was investigated. Energy plantations were established to evaluate the growth and development of hybrid poplar cuttings planted at densities of 0.09, 0.19, 0.37 m^2 of growing space per tree. Treated municipal wastewater was used to irrigate half of the plantations during the growing season (April to October) at the rate of 5 cm per week. Wastewater irrigation significantly increased diameter and total height growth. Total woody biomass (stemwood, bark, and branches) production was more than doubled by wastewater irrigation. Wastewater was satisfactorily renovated by the hybrid poplar plantations at all growing spaces. Results indicate that potential annual biomass production could reach 30 dt/ha with wastewater irrigation. Significant amounts of nutrients are recycled annually back to the soil in leaf fall which would preclude any nutrient depletion of the site as a result of frequent harvesting. Soil warming with wastewater irrigation can increase biomass production of sycamore by 100 percent compared to wastewater irrigation alone and by over 200 percent relative to control areas. Response is very species or clone dependent and soil warming with wastewater irrigation can also reduce biomass production compared to wastewater irrigation alone. 13 references, 17 figures, 45 tables.

30511 **(EPRI-AP—3532) Thin-film indium phosphide photovoltaic device research and development. Final report.** Chu, T.L.; Chu, S.C.; Chang, C.T.; Kuper, A.B.; Lin, C.L.; Tzeng, Y.C. (Poly Solar, Inc., Garland, TX (USA)). May 1984. 67p. Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920412.

Indium phosphide, a direct gap semiconductor with a room temperature energy gap of 1.35 eV, is a promising material for thin film photovoltaic devices. Thin films of indium phosphide have been deposited on several foreign substrates, including W/graphite

and Al/graphite, by the reaction of indium, hydrogen chloride, and phosphine in a gas flow system, and their structural and crystallographic properties investigated. The electrical properties of indium phosphide films were evaluated from the dark current-voltage characteristics of Schottky barriers prepared from these films. All Schottky barriers have been found to exhibit low rectification ratios and high dark currents due to grain boundary effects, and consequently, the solar cells have poor photovoltaic responses. The grain boundary effects can be reduced to some extent by thermal oxidation, ruthenium (III) treatment, and nitridation, thereby improving the photovoltaic characteristics of thin film indium phosphide Schottky barrier devices. N-ITO/p-InP thin film solar cells show improved photoresponse than Schottky barrier solar cells; however, their conversion efficiencies are inadequate for terrestrial applications. It is concluded that indium phosphide films deposited by the halide process are not suitable directly for high efficiency thin film photovoltaic devices due to at least two factors: dopant segregation at grain bondaries and irregular packing of grains in the films. The recrystallization of vapor-deposited indium phosphide films by using a pulsed laser is suggested as an approach to eliminate the deleterious effects associated with the irregular packing of grains in the film.

30512 **(FRNC-TH—1523) Production and characterization of Cu_2S obtained by dipping from CdS chemically sprayed. Study of heat treatments of Cu_2S/CdS sprayed solar cells.** Marjan, M. (Montpellier-2 Univ., 34 (France)). Jul 1980. 92p. (In French). NTIS (US Sales Only), PC A05. Order Number DE84751548.

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The solar cell comprises a pyrex plate covered with a transparent electrode a layer of CdS + Al_2O_3 and a layer of CdS obtained by chemical spraying Cu_2S is obtained by treatment of CdS with a hot solution of CuCl(backwall structure). A p-n junction is obtained between CdS and Cusub(x)S. Thickness and stoichiometry of Cusub(x)S are studied. Photoelectrical properties are improved by annealing. Optical properties and structure of CuS are examined.

30513 **(NYSERDA—84-10) High-efficiency multi-colored photovoltaic cells. Final report.** Hovel, H.J. (IBM Watson Research Center, Yorktown Heights, NY (USA)). Sep 1983. 153p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223. Order Number TI84901266.

Several configurations of tandem solar cells are described. One of these, made with amorphous Si on crystalline Si, is a low-cost structure of moderate potential efficiency (15 to 20%); while the others have theoretical efficiencies of 40 to 50% under various levels of sunlight concentration. The theoretical performances of several material combinations are computed under single-load and separate-load operation, and the effects of series and shunt resistances are shown. Computations are also made of the optimum optical coating and ohmic contact grid design that are needed to construct high efficiency working devices. The epitaxial growth of GaAs, Ge, AlAs, and Si are then described for use in the several configurations that were studied. Finally, measurements of individual solar cells and tandem solar cells at one sun intensity and under several levels of sunlight concentration are described.

30514 **(SAND—84-0579C) Neutron damage effects in AlGaAs/GaAs solar cells.** Barnes, C.E.; Wiczer, J.J. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 5p. (CONF-840712—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84009448.

From 21. IEEE annual conference on nuclear and space radiation effects; Colorado Springs, CO, USA (22 Jul 1984).

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The AlGaAs/GaAs solar cells examined in the study were obtained from three sources. One set consisted of four layers of epitaxial material grown on n-type GaAs substrates by metal organic chemical vapor deposition (MOCVD). Following deposition of a thick n-type GaAs buffer layer, the p-type GaAs active layer is grown, followed by deposition of the AlGaAs window layer and a p^+ GaAs contacting layer. The second set are also grown by MOCVD, but a top GaAs contacting layer is not used. The third set are fabricated by liquid phase epitaxy, and they do not have a top contacting layer. In addition to forward and reverse I-V characteristics and capacitance-reverse voltage measurements, quantum efficiency spectra were taken between 350 nm and 900 nm prior to and following fast neutron irradiation in the Sandia Pulsed Reactor (SPR II). (LEW)

30515 **(SERI/PR—211-2236) SERI photovoltaics advanced research and development: FY 1983 accomplishments.** (Solar Energy Research Inst., Golden, CO (USA)). Mar 1984. Contract AC02-83CH10093. 56p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84004493.

This report contains the technical highlights of SERI's program in photovoltaics research and development and a bibliography of resulting publications for FY 1983, SERI's participation in a Thin Film Research Task Force appointed by the U.S. Department of Energy led to the formation of technology offices having broad program and implementation responsibilities. This kind of an office was begun at SERI in the amorphous silicon area. A multiyear cost-sharing (federal-industry) initiative was also begun to spur industrial R and D in high-efficiency, single-junction and multijunction amorphous silicon thin film solar cells, and steps were taken to further develop measurement and device analysis capabilities of solar cells. The FY 1983 accomplishments are categorized according to SERI's subcontract R and D areas: amorphous thin films, advanced high-efficiency concepts, polycrystalline thin films, polycrystalline silicon, and photoelectrochemical cells. These accomplishments are also broken down according to SERI's internal PV tasks: PV devices and measurements, solid state research, insolation resource assessment, advanced PV systems research, and performance criteria/test methods development. A bibliography covering literature published in fiscal year 1983 is included with over 200 citations.

30516 **(SERI/TR—231-2159, pp 3-41) Program element: aquatic species.** Feb 1984. NTIS, PC A06/MF A01. Order Number TI84004487.

In SERI Biomass Program. FY 1983 annual report.

Work with macroalgae and emergents concentrated on the selection of the most productive species and culture management strategies that maximize yield at low cost. Two macroalgal species have been found and improved, Ulva and Gracilaria. The approach of lowering costs through energy and nutrient reductions has been rewarding, and provides a model for future efforts by this subprogram. The most promising emergent plant for culture in the Great Lakes region is Typha. Recent emphasis of this subprogram has been developing microalgae culture technology. The program concentrated on the screening of microalgae for rapid growth in a saline media at high densities and high lipid yields. Ankistrodemus, collected from a Pyramid Lake, Isochrysis, various Chlorella strains, and Platymonas seem promising. Lipids derived from microalgae are being emphasized, since lipids are high energy compounds, and various lipid fractions may either be used directly as liquid fuels or are easily converted to liquid fuels. Lipid synthesis may be controlled through culture manipulation. Two outdoor facilities were operated during the past year, a shallow raceway in Hawaii and a deep pond system in California. The productivities have been dependent on climatic conditions and species cultured. Productivities were 20 to 25 g m^{-2} day^{-1} for the raceway, and 16 to 20 g m^{-2} day^{-1} for the pond. A technique has been developed for optimizing culture parameters to a particular species in a rapid, efficient manner. Technology analysis activities involved work on resource assessment, including a review of existing research literature describing the local environment, climate, water resources, hydrology, and biota of the southwestern United States. Also involved is the development of a mass culturing model to provide an analytical tool for evaluating microalgal production systems. 26 figures, 12 tables.

30517 **United States Federal Photovoltaic Program status.** Prince, M.B.; Annan, R.H.; Krantz, A.D. (Department of Energy, Washington, DC (USA). Photovoltaic Energy Tech. Div.). pp 216-220 of Fifth E.C. photovoltaic solar energy conference. Proceedings of the international conference, held at Kavouri (Athens), Greece, 17-21 October 1983. Palz, W.; Fittipaldi, F. (eds.). Dordrecht, Netherlands; D. Reidel Publishing Company (1984). (CONF-831028—).

From Photovoltaic solar energy conference; Athens, Greece (17 Oct 1983).

The United States Federal Photovoltaic Program has recently completed a five-year research plan for the period 1984 through 1988. This plan embodies the program philosophy of supporting primarily long-term research and development, with enough support for base-line and near-term technology to maintain momentum in the growth of photovoltaics. A key strategy element is the continuation of the informal government/industry partnership which is so crucial to the successful development of photovoltaic technology. In general, the federal program provides support for activities which are likely to yield a positive long-term benefit but which industry is unlikely to pursue on its own because of the costs and risks involved. The primary research emphasis is the development of promising new approaches to photovoltaic cells such as thin film and multi-junction concepts. Emphasis is also placed on completing the development of flat plate silicon designs which yield improved conversion efficiencies and are amenable to automated production. Other research areas include the development of improved array fields, power conditioners, and concentrator collectors. The research plan maintains program continuity by retaining all ten research tasks which embodied the fiscal year 1983 program structure. These are as follows: single junction thin films; high efficiency multi-junction concepts; innovative concepts; silicon materials; advanced silicon sheet; flat plate collectors; concentrator collectors; module reliability; array and BOS development; systems experiments. (A.V.)

30518 **A review of the experiences of the U.S. Department of Energy photovoltaic residential experiment stations.** Biringer, K.L.; Menicucci, D.F. (Sandia National Labs., Albuquerque, NM (USA)). pp 304-308 of Fifth E.C. photovoltaic solar energy conference. Proceedings of the international conference, held at Kavouri (Athens), Greece, 17-21 October 1983. Palz, W.; Fittipaldi, F. (eds.). Dordrecht, Netherlands; D. Reidel Publishing Company (1984). (CONF-831028—).

From Photovoltaic solar energy conference; Athens, Greece (17 Oct 1983).

The residential system experiments portion of the U.S. Department of Energy (DOE) photovoltaic (PV) program is designed to answer questions on the design, installation, and operation of small roof-mounted PV systems. The information learned is then fed back into the other system and component development portions of the program to improve understanding of these systems. The area of emphasis is grid-connected PV systems that operate interactively with the local utility. This paper describes the residential experiment stations built to test and evaluate residential PV systems and focuses on a number of experiences to date. Addressed also are some of the remaining unresolved issues and the plans for specific data analysis and experimentation aimed at answering the remaining questions. (A.V.)

30519 **Reactive ion etching of aluminium/silicon.** Light, R.W. (Sandia National Laboratories Albuquerque, NM). *Journal of the Electrochemical Society;* **130**: No. 11, 2225-2230(Nov 1983). Contract AC04-76DP00789.

High resolution, reproducible dry etching of Al/Si can be achieved using BCl_3/Cl_2 composition, the number of wafers in the reactor, and the d-c self-bias voltage. Increases in the concentration of etching species produced by raising the percentage of Cl_2 in BCl_3 and by decreasing the wafer load increases the total etch rate while enhancing the isotropic etch rate relative to the anisotropic etch rate. The d-c self-bias voltage (or applied rf power) appears to partition the active etching species between isotropic etching and anisotropic etching without affecting the total etch rate.

30520 **BP-stabilized n-Si and n-GaAs photoanodes.** Ginley, D.S.; Baughman, R.J.; Butler, M.A. (Sandia National Laboratories, Albuquerque, New Mexico). *Journal of the Electrochemical Society;* **130**: No. 10, 1999-2002(Oct 1983).

Thin boron phosphide overlayers, employed as transparent conductive windows, have been deposited on n-Si and n-GaAs photoanodes. Significantly enhanced stabilities are observed in ferro-ferricyanide electrolytes. Spectral response and I-V data for aging experiments, as well as a discussion of the energy level diagrams for the heterojunctions, are presented.

30521 **Constraints to bio-energy development.** Parsons, V.B. (Systems Analysis and Assessment Division Los Alamos Scientific Laboratory Los Alamos, New Mexico). *Alternative Energy Sources;* **3**: 229-236(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

The energy crisis has prompted research and development of renewable, domestic, cost-effective and publicly acceptable energy alternatives. Among these are the bioconversion technologies. To date bio-energy research has been directed toward the mechanics of the conversion processes and technical assessment of the environmental impacts. However, there are other obstacles to overcome before biomass can be converted to more useful forms of energy that fit existing need. This paper identifies barriers to bio-energy resource application in the US. In addition, examples from several agricultural regions serve to illustrate site-specific resource problems.

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REFER ALSO TO CITATION(S) 30503, 30506, 30518

30522 **(CONF-800196—Summ.) Final report of the SPS space transportation workshop.** (Alabama Univ., Huntsville (USA). Kenneth E. Johnson Environmental and Energy Center). Oct 1980. Contract AI01-79ER10035. 147p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012295.

From SPS space transportation workshop; Huntsville, AL, USA (29 Jan 1980).

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After a brief description of space power system concepts and the current status of the SPS program, issues relevant to earth-surface-to-low-earth-orbit (ESLEO) and orbit-to-orbit transport are discussed. For ESLEO, vehicle concepts include shuttle transportation systems, heavy lift launch vehicles, and single-stage-to-orbit vehicles. Orbit transfer vehicle missions include transport of cargo and the SPS module from low earth orbit to geosynchronous earth orbit as well as personnel transport. Vehicles discussed for such missions include chemical rocket orbital transfer vehicles, and electric orbital transfer vehicles. Further discussions include SPS station-keeping and attitude control, intra-orbit transport, and advanced propulsion and vehicle concepts. (LEW)

30523 **(DOE/CS/30077—T4) McClellan PV system installation provides key lessons.** Kauffman, W.R. (BDM Corp., Albuquerque, NM (USA)). 22 Nov 1983. Contract AI01-79CS30077. 98p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012699.

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BDM provided the primary engineering effort required to complete the design, specification, procurement, installation and checkout of a 40 kW photovoltaic system for McClellan Air Force Base in California. This power system provides all of the energy required to run a small market in the Capehart Military Housing facility at McClellan. Excess power is provided to the surrounding homes by feeding the energy back on the local utility grid. The project has been designated at the Air Force Showcase in the area of photovoltaic energy systems. The program was a small business set aside with Uhl and Lopez Engineers, Inc., as the prime contractor supported by the BDM staff. Uhl and Lopez is a small business electrical engineering consulting firm in Albuquerque, New Mexico. The photovoltaic array consists of 1142 ARCO photovoltaic panels configured in a fixed tilt non-tracking orientation. The

dc power generated by these modules is inverted to alternating current by a 45 kW Helionetics inverter. The system has demonstrated performance consistent with BDM engineering estimates and design projections show that in excess of 57,000 MWh/year of electrical energy will be generated by the array.

30524 **(DOE/ER/10035—T1) Final report of the SPS energy conversion and power management workshop, February 5-7, 1980, Von Braun Civic Center, Huntsville, Alabama.** (Alabama Univ., Huntsville (USA). Kenneth E. Johnson Environmental and Energy Center). Jun 1980. Contract AI01-79ER10035. 99p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012294.

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This workshop is a peer review of the information available on the Satellite Power System (SPS). Areas discussed include: resource issues and performance demonstration issues regarding gallium arsenide and silicon photovoltaic conversion; solar blanket and array integration issues; collector structures and advanced thermal power cycles relevant to solar thermal conversion systems; space radiators; life-expectancy of rotating machinery in space; and electric power distribution, processing, and power management. (LEW)

30525 **(FRNC-TH—1522) Analysis of a photovoltaic dwelling in remote sites.** Eliot, P. (Nice Univ., 06 (France)). Jan 1982. 185p. (In French). NTIS (US Sales Only), PC A09. Order Number DE84751544.

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This work is a design analysis of autonomous or quasi-autonomous photovolaic system suited to dwellings on remote sites in France; this study allowed to establish "curves" of sizing related to several performance, from which it is possible to estimate costs (under many conditions of house occupancy, of climates). The interest of a back-up generating sit for the permanent resident is studied. Then, an adaptation and an improvement of existing analysis tools are looked.

30526 **(FRNC-TH—1534) Study of photovoltaic systems adapted to dwellings connected to the electric network.** Pergeline, V. (Nice Univ., 06 (France)). Jan 1982. 16p. (In French). NTIS (US Sales Only), PC A08. Order Number DE84751545.

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After the determination of the economic expressions related to photovoltaic systems, a method for optimizing the size of these systems is presented, and, it is possible to estimate their interest. The energetic behavior and performance of photovoltaic systems supplying energy principally for the specific electric consumption of a four persons family are studied. The interest of a photovoltaic taking in hot sanitary water heating is looked. The case of the photovoltaic water-heater is analysed. The study points out several important points, particularly the study of the interest of batteries and of the optimal investment date.

30527 **(NASA/CR—3339) Solid state SPS microwave generation and transmission study. Volume II. Phase II final report, appendices.** Maynard, O.E. (Raytheon Co., Wayland, MA (USA). Equipment Div.). Nov 1980. Contract AI01-79ER10035. 114p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012298.

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The purpose of this investigation was to further define the solid state sandwich concept for SPS. The design effort concentrated on the spacetenna, but did include some system analysis for parametric comparison reasons. The study specifically included definition and math modeling of basic solid state microwave devices, an initial conceptual subsystems and system design, sidelobe control and system selection, an assessment of selected system concept and parametric solid state microwave power transmission system data relevant to the SPS concept. Although device efficiency was not a goal of this study, the sensitivities to design of this efficiency were parametrically treated. Sidelobe control consisted of various single step tapers, multistep tapers and Gaussian tapers. A preliminary assessment of a hybrid concept using tubes and solid state is also included. There is a considerable amount of thermal analysis provided with emphasis on sensitivities to waste heat radiator form factor, emissivity, absorptivity, amplifier efficiency, material and junction temperature. The document is organized to provide useful design data for future studies, identify issues associated with the solid state sandwich design, and estimate technology requirements.

30528 **(NASA/CR—3345) Electrostatic protection of the solar power satellite and rectenna. Part II. Lightning protection of the rectenna.** (National Aeronautics and Space Administration, Washington, DC (USA)). Nov 1980. Contract AI01-79ER10035. 123p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012301.

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Computer simulations and laboratory tests were used to evaluate the hazard posed by lightning flashes to ground on the SPS rectenna and to make recommendations on a lightning protection system for the rectenna. The distribution of lightning over the lower 48 of the continental United States was determined, as were the interactions of lightning with the rectenna and the modes in which those interactions could damage the rectenna. The studies showed that lightning protection was both required and feasible. Several systems of lightning protection were considered and evaluated. These included two systems that employed lightning rods of different lengths and placed on top of the rectenna's billboards and a third, distributed system. The distributed system is similar to one used by power distribution companies; it consists of short lightning rods all along the length of each billboard that are connected by a horizontal wire above the billboard. The system that not only affords greater protection than the others considered but offers easiest integration into the rectenna's structural design, was the distributed lightning protection system.

30529 **Battery storage in residential applications of energy from photovoltaic sources.** Landgrebe, A.R.; Sonley, S.W. (U.S. Dept. of Energy, Washington, DC). *Applied Energy;* **15**: No. 2, 127-137(1983).

Electric energy storage in batteries is discussed for future applications in homeowner-controlled grid-tied photovoltaic power generation systems for residences. Energy storage would enable more effective matching of the intermittent solar-generated energy to high-use periods, as well as storage of energy for sale to the utilities, taking advantage of future variable (time-of-day) utility rate and buy-back structures. State-of-theart lead--acid batteries are economically viable for utility rate scenarios that are expected to be in effect in many areas of the United States in the mid-1980s. 'Advanced batteries' (e.g. sodium--sulfur, zinc--bromine, lithium--metal sulfide) with decreased capital investment costs, minimal maintenance and improved performance characteristics could have enhanced consumer acceptance in the late 1980s.

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REFER ALSO TO CITATION(S) 30522, 30524, 30563

30530 **(CONF-8304133—Exec.Summ.) IEA/SSPS - CRS Workshop, April 1983. Executive summary.** Selvage, C.S. (Sandia National Labs., Livermore, CA (USA); Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.)). Mar 1984. Contract AC04-76DR00789. 24p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012476.

From SSPS Central Receiver System (CRS) midterm workshop; Tabernas, Spain (19 Apr 1983).

Portions are illegible in microfiche products; SSPS Technical Report No. 1/84.

On April 19 and 20, 1983, a workshop on the Central Receiver System (CRS) of the IEA-Small Solar Power Systems (IEA/SSPS) project was held in Tabernas, Spain. The objective of this workshop was twofold: to compare the SSPS-CRS design intentions with the first-year operational results, and to draw conclusions from these comparisons. Although the material for these comparisons was presented in the workshop, actual comparison was not made; this and any subsequent conclusions have been left to the reader of the workshop proceedings. Consequently, the purpose of summarizing the workshop proceedings is to assist the reader by

identifying data (i.e., papers) for possible comparison and then suggesting some conclusions. The table of contents of the workshop proceedings presents a logical breakdown of the elements under evaluation. The first papers review the system as a whole - an overall description of the design, intent, and realization of the plant is provided; plant performance and losses (with a stair-step) are described; and some specific issues, such as subsystem problems, are discussed. Operational strategies (planned and actual) are also included. After this section, the important subsystems, e.g., the heliostat field and the Sodium Heat Transfer System (which includes the receiver, storage system, and the steam generator) are described and their performances reported.

30531 **(DOE/ET/21007—5) 10 MWe solar thermal central receiver pilot plant. Phase II, planning.** (Martin Marietta Aerospace, Denver, CO (USA)). Aug 1979. Contract AC03-79ET21007. 21p. (STMPO—287). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011221.

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This Phase II planning document presents the various considerations related to the Phase II schedules, material control and personnel training required to effectively implement the program. This document has been prepared to identify the flow charts and schedules required to accomplish fabrication, installation, checkout, and personnel training to support the Pilot Plant schedule. The planning addresses receiving, storage and shipment of raw materials, subassemblies, component, subsystems, and complete assemblies. The vendor activities and the major Martin Marietta facilities are included. These are the Mirror Assembly activities at Pueblo, Colorado and the heliostat assembly and installation activities at the Barstow-Daggett Airport and the solar plant.

30532 **(DOE/SF/00700—T6) Computer simulation of the thermal storage systems in the solar 10 MWe pilot plant.** Alexander, E.L. (Rockwell International Corp., Canoga Park, CA (USA). Energy Technology Engineering Center). Mar 1979. Contract AC03-76SF00700. 140p. (STMPO—066). NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012767.

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A complete dynamic simulation of the Solar 10 MWe Pilot Plant Thermal Storage System is provided by the three APL computer programs (SIM5, SIM6, and TSU) which are listed in this report. The simulation programs include both process variables and simulated 3 mode control systems to control fluid flows. Sets of constants were found by trial and error for the gain factors for each simulated controller in each of 3 modes. Preliminary estimates of control valve time constants were made. Heat exchanger areas that are sufficient to obtain maximum duty in the oil heater system and in the steam generator system were obtained by running the simulation programs. The areas and general specifications of the heat exchangers that will meet the requirements are given in the section on Heat Exchanger Design Parameters. The behavior of the oil heater system to a cloud-induced transient exhibited marginal to unsatisfactory performance in the oil flow control system. It is believed that a better choice of control constants and possibly a modified valve time constant will rectify this problem. The steam generator system gave satisfactory response to a transient 10 times as severe as the daily startup transient.

30533 **(DOE/SF/00700—T7) 10 MWe solar thermal central receiver pilot plant operational testing plan.** Droher, J.J.; Leppard, J.A.; Wiese, R.W. (Rockwell International Corp., Canoga Park, CA (USA). Energy Technology Engineering Center). 23 Dec 1981. Contract AC03-76SF00700. 279p. (STMPO—065). NTIS, PC A13/MF A01; 1; GPO Dep. Order Number DE84011307.

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This document delineates the plan for operational testing of the 10 MWe Solar Thermal Central Receiver Pilot Plant at Barstow, CA. During an initial two-year experimental period, a wide variety of tests will be conducted to accumulate data on performance of the plant and its subsystems and components. By the end of this period it is expected that a reasonably complete engineering evaluation of the plant will have been completed. In addition, plant operating modes and control configurations will have been optimized for various combinations of clear and cloudy scenarios. Based upon this knowledge, the test program can then proceed to a follow-on three-year power production period to demonstrate the capability of the pilot plant to supply electrical power to the SCE grid at capacity factors expected for a solar thermal plant. In addition to delineating the complete test program, this test plan includes pertinent system descriptions and provides information on test management, test schedules, measurement requirements, data management, and technology transfer. Test specifications for individual tests involving the entire plant are given in Appendix A. Appendix B lists the requirements for component performance evaluation tests. These are tests which involve individual aspects of the overall plant (e.g., the heliostat mirrors) for which data must be obtained at repetitive intervals throughout the operational test phase. Appendix C provides information on the computations needed for in-test and post-test data reduction. Appendix D discusses test precautions and operational considerations which influenced the choice of test parameters and the sequencing selection for pilot plant testing.

30534 **(DOE/SF/10501—010) Project charter: 10 MWe solar thermal central receiver pilot plant.** (USDOE Solar One Project Office, Daggett, CA). 18 Apr 1979. Contract FC03-77SF10501. 16p. (STMPO—055). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84008898.

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This document outlines the purpose of the project; project objectives and goals; and organization; project management; project assistance; reporting channels and requirements; and transition to operations/termination plan.

30535 **(DOE/SF/10501—012) 10 MWe solar thermal central receiver pilot plant: project management plan.** (USDOE Solar One Project Office, Daggett, CA). Jul 1979. Contract FC03-77SF10501. 73p. (STMPO—059). NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84008956.

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The objective of the Solar Thermal Power Systems (STPS) Program is to establish the technical readiness of cost-competitive solar thermal power systems for both small (under 10 MWe) and large (over 10 MWe) energy production applications. The Project Management Plan has been developed to outline plans, baselines (technical, schedule, and cost), and control systems to be employed in the management of the project. This management plan does not change or modify the two-party roles and responsibilities set forth in the Cooperative Agreement for DOE and the Associates; but, the plan is intended to clarify the roles of all participating organizations and to further define procedures for managing the project. This management plan is intended to primarily cover the Project phases of plant design and construction, including plant checkout.

30536 **(DOE/SF/10539—08) Operations instructions heliostat field subsystem for 10 megawatt solar power systems/ central receiver system.** Smeal, D.G. (Martin Marietta Aerospace, Denver, CO (USA)). Oct 1981. Contract AC03-80SF10539. 81p. (STMPO—295; MCR—81-1708A). NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84011434.

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This manual provides the information necessary to start (initialize) the heliostats, place the beams on the collector target, and return the heliostats to the Stow position. Detailed safety requirements and procedures are provided for the console operator.

30537 **(DOE/SF/10539—10) 10 MWe solar thermal central receiver pilot plant. Collector subsystem functional test report.** (Martin Marietta Corp., Baltimore, MD (USA)). Dec 1981. Contract AC03-80SF10539. 366p. (STMPO—297). NTIS, PC A16; 3; GPO Dep. Order Number DE84011437.

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This document presents the results of the Collector Subsystem (CS) Functional Testing. The testing was performed to demonstrate the systems level operational performance of the CS on a stand-alone basis. The testing involved issuing commands from the Heliostat Array Controllers (HAC's) and veryifying responses by visual observation of the heliostat movements in the field and by observation of the readouts on the HAC displays and printer. All

tests were completed successfully. Testing was performed from 9 November 1981 through 18 November 1981.

30538 **(DOE/SF/10539—14) Heliostat field controller software source listing: version A02.** Leniger, K.A.; Powell, D.A. (Martin Marietta Corp., Denver, CO (USA)). 13 Feb 1980. Contract AC03-80SF10539. 88p. (STMPO—564). NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012608.

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30539 **(DOE/SF/10539—15) Heliostat controller software source listing: version All-Barstow.** (Martin Marietta Aerospace, Denver, CO (USA)). 22 Oct 1980. Contract AC03-80SF10539. 66p. (STMPO—565). NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012980.

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30540 **(DOE/SF/10539—18) Collector subsystem, collector system functional test: Test Procedure 111. Revision 1.** Rose, G.R. (Martin Marietta Corp., Denver, CO (USA)). 29 Sep 1981. Contract AC03-80SF10539. 269p. (STMPO—568). NTIS, PC A12/MF A01; 1; GPO Dep. Order Number DE84012462.

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This document has been prepared in order to demonstrate the capability of the collector subsystem to operate as a stand alone system, to demonstrate the capability of the Heliostat Array Controller (HAC) to control the heliostat field, and to satisfy prerequisite HAC control and command responses in support of pre-operational testing.

30541 **(FRNC-TH—1520) Evaluation and conception method of fields of focused heliostats.** Hennet, J.C. (Toulouse-3 Univ., 31 (France)). May 1982. 188p. (In French). NTIS (US Sales Only), PC A09. Order Number DE84751546.

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Accurate and efficient models are needed to assess and to conceive fields of focused heliostats having a high concentration ratio. This is why analytical models to calculate flux densities on the aperture plane of a cavity receiver and shadow effects between heliostat, have been built. In order to evaluate the average yearly performance of a heliostat field, the representation by a "performance matrix" is introduced. This modelling allows for a detailed study of the quality of selected locations. The heliostat location is formulated as a quadratic combinatorial problem, and some techniques of resolution are described. Then, parametric analysis provides a help for the heliostat field conception problem.

30542 **(GESER—018) Dimensioning of the Hitec circuit of the Them-Thek preliminary project (After-Themis studies).** Pons, M. (Centre National de la Recherche Scientifique, 75 - Paris (France)). Oct 1980. 34p. (In French). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84751549.

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Knowing the exchanged powers during the different operating modes of the solar power plant, the economizer and the Hitec evaporator have to be dimensioned for the operation at one-third of load, and, the superheater and the re-superheater have to be dimensioned for the nominal load. The Hitec circulating system and the energy balance of the power plant are studied and presented in three cases: nominal operation, destorage, and, beginning and end of storage. The storage balance is finally presented; it allows to give back, when there is no sun, about 72% of the lack in electric energy due to the reconstitution of the storage.

1408 Ocean Energy Systems

30543 **(PB—84-149376) Ecological analysis of spatial and temporal patterns of pelagic ecosystem components potentially interacting with an OTEC (Ocean Thermal Energy Conversion) plant near Punta Tuna, Puerto Rico: physical characteristics. Final report.** Lopez, J.M.; Tilly, L.J. (Center for Energy and Environment Research, Mayaguez (Puerto Rico)). 1983. 45p. NTIS, PC A03/MF A01.

This hydrographic study characterizes the Punta Tuna area as a potential site for an OTEC power plant. Seven cruises were conducted at approximately two month intervals. Each cruise included at least 22 hydrocast stations, six done as serial stations in a small area to reveal temporal and small scale variability. The results of the analysis of these data so far indicate a bi-seasonality in the dynamics. Mesoscale eddies and meanders are a common feature of the circulation pattern on Puerto Rico's southern coast. The time series studies have shown their existence of a very energetic internal wave field with relatively large amplitude waves at the diurnal and semi-diurnal tidal frequencies. The results in terms of an OTEC power plant indicate the thermal resource to be at least a 20C thermal gradient in the upper 100 m year round.

30544 **Aluminum industry applications for OTEC.** Jones, M.S.; Leshaw, D.; Sathyanarayana, K.; Sprouse, A.M.; Thiagarajan, V. (Reynolds Metals Company Sheffield, Alabama). *Alternative Energy Sources;* 4: 277-288(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

The objective of the program is to study the integration issues which must be resolved to realize the market potential of ocean thermal energy conversion (OTEC) power for the aluminum industry. The study established, as a baseline, an OTEC plant with an electrical output of 100 MWe which would power an aluminum reduction plant. The reduction plant would have a nominal annual output of about 60,000 metric tons of aluminum metal. Three modes of operation were studied, viz: 1. A reduction plant on shore and a floating OTEC power plant moored offshore supplying energy by cable. 2. A reduction plant on shore and a floating OTEC power plant at sea supplying energy by means of an "energy bridge." 3. A floating reduction plant on the same platform as the OTEC power plant. For the floating OTEC/aluminum plantship, three reduction processes were examined. 1. The conventional Hall process with prebaked anodes. 2. The drained cathode Hall cell process. 3. The aluminum chloride reduction process.

1409 Solar Thermal Utilization

REFER ALSO TO CITATION(S) 30525, 30525, 30526, 31108, 31108

30545 **(CONF-821260—Summ.) Summary of the active solar air systems workshop held December 8, 1982.** (National Research Council of Canada, Ottawa, Ontario). 1983. 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84901075.

From Active solar air systems workshop; Ottawa, Canada (8 Dec 1982).

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The purpose of the workshop was to further communication regarding the state-of-the-art in air systems and to identify promising applications and areas where further research and development programs are necessary. A summary of each presentation is given along with the main points raised during the discussions.

30546 **(DOE/BP—208) Preventing solar heat gain through the south facing windows of the Bonneville Power Administration headquarters.** Gardner, C.M. (USDOE Bonneville Power Administration, Portland, OR). Aug 1983. 32p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84009721.

The Bonneville Power Administration has occupied the building located at 1002 N.E. Holladay since 1952. During this time the occupants of the offices on the south side of the building have

suffered due to solar heat gain through approximately 4200 square feet of windows. These windows have overhangs which protect them from direct solar gain during the months of May, June, July, and most of August. The overhangs do not eliminate the effects of indirect radiation during these months, however, and from the period of late August to late April do not block all the direct radiation either. For these reasons a study was undertaken to determine what factors contributed most to the problem, and to decide what product should be installed on the windows to block the solar heat gain. An investigation of the heating and cooling requirements of the building showed that the cooling load was consistently greater (with the exception of one month) than the heating load. For this reason the building was determined to be cooling dominated and it was decided that the final product purchased need not have insulating qualities. This study showed the least expensive and most efficient means of blocking solar heat gain to the building to be solar control films. Besides increasing the comfort of the occupants and being attractive in appearance a cooling load calculation indicates that a savings of approximately 156 MBtu/year could be expected with the films installed. This represents a cooling energy decrease of 43%.

30547 **(DOE/CE—0068) Solar energy and your home: questions and answers.** (Conservation and Renewable Energy Inquiry and Referral Service, Silver Spring, MD (USA)). Jan 1984. 5p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84008981.

This fact sheet provides a basic introduction to solar heating and cooling systems. It is intended for the many homeowners who could benefit from living in a solar home.

30548 **(DOE/CE/30742—16) Passive solar commercial buildings project. Project status report, January 1-January 31, 1984.** (ESG, Inc., Atlanta, GA (USA)). Jan 1984. Contract AC02-82CE30742. 51p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84006982.

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The data from the Security State Bank is ready for BLAST analysis. The TMY data from the test data needs to be placed in BLAST readable format before analysis can continue. A further examination of the infiltration data taken during the site visit has led to some encouraging results. Most of the usable data compares well with air flow predictions made by the Aeolian Kinetics data logger and natural infiltration rates have been obtained. An initial BLAST model of the Johnson Controls building has been created consisting of five thermal zones, three of which are supplied by heating and cooling equipment. Site data taken by the Aeolian Kinetics data logger has been used to develop equipment schedules for the final BLAST model. The building alterations test required to calibrate the BLAST model is currently being performed. This test should be completed and data sent to ESG by the end of February 1984. The task status of computer modeling, daylighting analysis and performance monitoring is reported.

30549 **(DOE/CH/00178—T22) Solar energy: a brief assessment.** (Solar Energy Research Inst., Golden, CO (USA)). Sep 1983. Contract AC02-77CH00178. 55p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012207.

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This report discusses active and passive heating and cooling systems, process heat, solar ponds, and photovoltaic power systems. Explanations of these technologies, their applications, technical and economic performance, future developments, and legal and environmental issues are presented. Maps showing the general locations of good insolation resources (i.e., available solar power) are also presented in Appendix A. This information can be used to identify areas with promising solar applications potential, and to key into more detailed local resource data within Western's 15-state power marketing area.

30550 **(DOE/CS/30244—1) Experimental study of thermocirculation in a variable geometry Trombe wall. Final report.** Casperson, R.L. (Energy Engineering Group, Inc., Idaho Springs, CO (USA)). 30 Apr 1984. Contract FG02-79CS30244. 270p. NTIS, PC A12/MF A01; 1; GPO Dep. Order Number DE84011676.

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Experimental data on the thermocirculation in a variable geometry Trombe wall is presented for a full-scale test facility located in Idaho Springs, Colorado. Anemometry data representing velocity and temperature profiles in the Trombe wall air gap was obtained over a five month period from October to March of the 1980-1981 heating season. A considerable amount of data was collected due to a fortuitous weather pattern in this time period typified by clear sky conditions and calm winds. In addition to the anemometry data, concurrent temperature and solar radiation data was collected. The resulting data sets completely describe an experimental control volume on the east-west vertical centerplane of the Trombe wall. This control volume encompasses the double glazed plexiglass window cover unit, the concrete storage wall, and the anemometry measuring ports that passed through the concrete wall at two elevations. Additional thermocouple data was collected in the ambient air and in the inlet and outlet vents to the Trombe wall. Data was collected for four different wall air gap widths in combination with three different inlet/outlet vent cross-sectional flow areas. Wall gap widths of 2, 4, 6 and 8 inches were investigated.

30551 **(DOE/CS/30581—T1) Sunearth uni-directional damper. Final report.** (South Street Design, Philadelphia, PA (USA)). 15 Oct 1983. Contract FC02-80CS30581. 130p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE83016818.

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It was proposed to bring a self-actuating Trombe wall unidirectional damper to market. This extended final report explains the work that was undertaken on this project to date, a detailed explanation of the rationale for aborting the project at this point and proposals for future work that might be undertaken by Sunearth Solar Products or some other interested manufacturer to bring the damper to market. In addition, an outline of a Mass Wall User's Manual that was under development when the project was terminated, as well as many of the illustrations intended for this manual, are included in this report.

30552 **(DOE/R7/01024—T1) Passive solar greenhouse, middle earth farms. Final report.** (Middle Earth Farms, Louisburg, MO (USA)). 1 Dec 1980. Contract FG47-79R701024. 27p. NTIS, PC A03; 3; GPO Dep. Order Number DE84007748.

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Results are given on the development of a commercial solar greenhouse operation using solar heat, local organic fertilizer, rainwater, and biological control of insects to produce low energy cost, high quality plants and fish.

30553 **(DOE/R7/01172—T1) Direct gain passive solar, domestic hot water and wind generation system. Final technical report.** Miller, J.A. (Miller (James A.), Kearney, NE (USA)). 8 Jan 1982. Contract FG47-80R701172. 66p. NTIS, PC A04; 3; GPO Dep. Order Number DE84010090.

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The passive solar residence was occupied in late October, 1980. During the past year the dwelling was monitored and performed according to design expectations. There have been several hundred people visit the project and there have been several newspaper stories and television spots pertaining to the solar house, the wind energy conversion system, and the solar domestic hot water heater. Considerable time was spent in working with the local Public Power Company on a contract to interconnect the wind system with the public power grid. The double metering system and the rate structure of the Power Company eliminates almost all incentive for a person to purchase a wind energy conversion system with intent to interconnect with the public power grid. At present, based upon limited data, a consumer who owns a wind system is able to realize only about 25% of the total output of a system as compared to what his monthly electricity bill would be without the system. The Jacobs Wind Electric System with the static frequency

changer (inverter) interconnected with the public power company has proven to be an excellent unit. A Domestic Hot Water Heater was installed in December of 1980. The unit has provided approximately 60% of the hot water needs for a family of five. The system has caused few problems with the exception of the sensor unit. Other than this one problem the solar DHW system seems to be of high quality and will provide a respectable payback for money invested by a homeowner.

30554 **(DOE/R7/01239—T1) City of Macon, Missouri solar energy project. Final report.** Holman, M. (Macon, City of, MO (USA)). 1982. Contract FG47-81R701239. 11p. NTIS, PC A02; 3; GPO Dep. Order Number DE84010455.

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Twenty fan-driven solar wall collectors were constructed in homes of low-to-moderate income families. A summary of this project is presented.

30555 **(DOE/R7/01251—T1) Solar heating, cooling and controller system for industrial and commercial building.** (Dunlap (Richard D.), Cape Girardeau, MO (USA)). 15 Aug 1983. Contract FG47-81R701251. 20p. NTIS, PC A02; 3; GPO Dep. Order Number DE84010436.

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This project was aimed at modernizing and improving an existing structure by addition of a thermally efficient additional work area. Also this project included the continuing development of a thermal control system. Utilizing a small inexpensive microcomputer, the control system provides for complete automation of the collection, inflow, outflow, storage creating data and logging system. Special attention was given to architectural considerations, which provide integration of the solar hardware into an esthetically attractive structure.

30556 **(EPRI-EM—3542) System controls for solar-heating and heat- and cool-storage systems. Final report.** Winn, C.B.; Winn, R.C.; Baer, C.; Armstrong, P. (Research Inst. of Colorado, Fort Collins (USA)). May 1984. 38p. EPRI, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920388.

This summary report describes control strategies for residential solar heating systems and off-peak heat and cool storage systems. Research was conducted to provide utilities with quantitative data to assess the impacts of these energy systems. Control strategies for selected reference residential energy systems were defined and optimized with respect to 1990 and 2000 owner and utility costs. Computer simulations were used to model the performance of optimal and suboptimal controllers applied to an off-peak storage system, a solar heating system, and a combined system. Each was modeled and compared to a baseline all-electric system using data for nine utility service areas. Other work included investigating the benefits of incorporating weather prediction into control systems, development of a mathematical model for predicting the performance of a passive solar dwelling, definition of controller requirements and specifications, outlining a test plan for the preferred control system, and development of a simplified mathematical methodology for analysis of residential HVAC systems and their utility interactions. The study found that an off-peak storage system using proportional control was the least-cost system. Recommended energy storage discharge strategies are: proportional control for either off-peak or solar storage during the heating season; weighted proportional for cooling season off-peak storage; and proportional discharge from December through February for combined systems, with conventional discharge for the remainder of the year. The comparative characteristics of the control strategies were fundamentally the same in all areas of the country.

30557 **(LA-UR—84-1507) Passive and low energy research and development: a global view.** Balcomb, J.D. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 11p. (CONF-840866—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012628.

From Conference on passive and low energy alternatives; Mexico City, Mexico (6 Aug 1984).

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Passive and low energy applications in buildings have become a topic of worldwide interest within the last few years. It has now been demonstrated very clearly that indoor comfort can be maintained with an expenditure of only 10 to 20% of the energy often required by modern buildings. This is accomplished through a combination of conservation measures to minimize the load, passive use of solar energy for heating, natural cooling, and daylighting. The major research emphasis has been on devising mathematical models to characterize heat flow within buildings, on the validation of these models by comparison with test results, and on the subsequent use of the models to investigate the influence of both design parameters and weather on system performance. Design guidelines have been developed, and simplified methods of analysis have been promulgated. Performance has been monitored in test modules, test buildings, and many residential and commercial buildings. The results both confirm good performance and establish the accuracy of model predictions. A significant change in the research picture has been seen in the last 4 years; whereas the major effort was originally in the United States, research is now being conducted in many countries throughout the world as many people have realized that passive and low energy methods are appropriate in virtually every climate and are well suited to economic, convenient, and reliable building construction and operation.

30558 **(LBL—17393) Electrochromic materials for the regulation of solar energy transmission through windows.** Lampert, C.M. (Lawrence Berkeley Lab., CA (USA)). Feb 1984. Contract AC03-76SF00098. 15p. (CONF-831278—1; EEB-W—84-04). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012165.

From 2. international workshop on the physics of semiconductor devices; New Delhi, India (5 Dec 1983).

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The concept of an architectural switching film based on solid-state electrochromism is introduced. Electrochromic films have the ability to dynamically control solar transmission through a glazing and to alter the energy conduction properties of the window. Switching properties of transition metal oxides based on tungsten and iridium are detailed. The properties of WO_3-based films, which can modify both the visible and near-infrared portions of the solar spectrum, are given.

30559 **(NP—4901230) Prevention of excess snow accumulation due to roof mounted solar collectors.** (Morrison, Hershfield, Theakston and Rowan Ltd., Guelph, Ontario (Canada)). Dec 1981. 86p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84901230.

This study was undertaken to review existing information and conduct model studies on the snow accumulations around various configurations of roof mounted solar collectors. The main objective was to determine which configurations would not cause accumulations in excess of those that would occur on the roof without the solar collectors. The review of existing information revealed that there is little in the published literature that gives guidance on the expected snow accumulations and only some very rough and ready rules on how to avoid excessive snow buildup. The present model tests were carried out using two approaches. In the first the sand-water analogue of snowdrifting was employed and the tests took place in a water flume using 1:200 scale models. In the second approach wind speed patterns near to the roof surface were measured on 1:50 scale models in a 1.2m x 2.4m boundary layer wind tunnel. From the sanddrift and wind speed patterns conclusions were drawn as to the propensity of particular solar collector configurations to cause snow buildup. The analysis of the model results consisted principally of comparing various configurations with each other and with the bare roof case. The water flume and wind tunnel results were in substantial agreement with each other in comparable cases. The variables examined in the tests were the position of the collector row on the roof, the gap between collector and roof, the angle of tilt, the number of rows, the row spacing, the building dimensions and wind direction.

30560 **Scaling relations for the performance of passive systems.** Subbarao, K. (Solar Energy Research Inst., Golden, CO). *Solar Energy;* 32: No. 1, 13-15(1984).

From the correlation curves of the monthly solar heating fraction (SHF) as a function of monthly solar load ratio (SLR) for six different passive systems, it is empirically demonstrated that the annual SHF is well correlated with January SHF; this correlation is essentially independent of the passive type but dependent on location (climate). It is then shown mathematically that this is equivalent to the following scaling relation: the monthly SHF as a function of the monthly SLR is the same for all passive systems up to a scale factor of SLR. This scale factor depends on the passive system and has important physical relevance. The approximate validity of this scaling law is discussed. The simplification of performance prediction resulting from such a scaling law, as well as from the correlation of annual versus January performances, is pointed out.

30561 **Analytical simulation models for solar heating system design.** McGarity, A.E.; Cohon, J.L.; ReVelle, C.S. (Department of Engineering, Swarthmore College, Swarthmore, PA). *Solar Energy;* 32: No. 1, 85-97(1984).

Presented here is a method of simulating the performance of solar heating systems which can be incorporated into a microcomputer-based system design and sizing procedure. A general analytical solution to the storage energy balance is presented, and a scheme for varying the parameters of the general solution to represent changes in the operating mode and the driving forces is detailed. Three different simulation methods which employ the general solution are described. Two of these methods use hourly data and the third uses daily data. Measured results from an actual system are compared with simulated results to validate the models. Also, simulated results and computing speeds are compared with the general simulation model TRNSYS. Finally, an example of a microcomputer application is discussed.

30562 **Direct solar steam generating system.** Vresk, J. (Argonne National Laboratory Argonne, IL). pp 4.64-4.72 of Energy conservation in the built environment. Minogue, P. Dublin, Ireland; An Foras Forbartha (1982). (CONF-8210216—).

From 3. international symposium on energy conservation in the built environment; Dublin, Ireland (1 Oct 1982).

This paper describes a new technology that generates steam by the use of solar energy. Steam is generated directly in the solar collectors. The advantages of direct solar steam generation are compared with the methods of indirect solar steam generation that are now in use. In addition, the paper presents schematics and modes of operation of a demonstration system now under construction at Argonne National Laboratory. To establish feasibility of the concept, and to obtain necessary design parameters, preliminary testing was conducted. Testing data, contained in this paper, establish the feasibility of direct solar steam generation. This concept is suitable for generating low-pressure steam (up to 240 kPa). The major applications are expected to be in process steam, absorption cooling, and steam heating.

1410 Solar Collectors And Concentrators

REFER ALSO TO CITATION(S) 30550

30563 **(BMFT-FB-T—83-283) Operational demonstration of a field of high performance flat plate collectors with isothermal heat transport.** Merges, V.; Klippel, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 37p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84751242.

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The solar plant with 21 m^2 of highly efficient flat plate collectors needs no electricity. Heat transport is provided by saturated steam, that condenses in a 4 m^3 storage tank. The operation temperature is set by the buffer gas pressure between 100 and 140°C. An absorption chiller is simulated as a heat consumer. Over a 15 months test period the collectors proved their high performance. Heat transport and temperature control offered highest reliability and the thermal stratification in the storage tank was satisfactory. Corrections require the collector leak proofness and the thermal insulation of the field pipes and the storage tank. The positive result now permits the design and construction of larger solar plants following the same technical principle.

30564 **(FRNC-TH-—1518) Theoretical and experimental characterization of a flat-plate air solar collector.** Sall, M. (Perpignan Univ., 66 (France)). Oct 1983. 194p. (In French). NTIS (US Sales Only), PC A09. Order Number DE84751542.

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The study has been carried out, taking into account the actual conditions of working. The instantaneous behavior of the collector has been studied, taking into consideration that this behavior depends on the part of the collector. The rational utilization of the heat carrier fluid going out of the collector calls for knowing exactly the increases of temperature it is subject to, when flowing through the collector. So, one aim of the study is to specify the effect of several factors on which depend the temperature variations. Theoretical methods applied to the calculation of a solar collector and of experimental research are reviewed. The description of the investigated collector and the experimental means in use are given. The theoretical and experimental determination of collector features are studied and presented.

30565 **(FSEC-RD—79-2-Pt.1) Solar collector testing program. Part 1: efficiency and exposure tests. Final report.** Beach, C.D. (Florida Solar Energy Center, Cape Canaveral (USA)). 15 May 1979. 79p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012197.

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Twenty-five water cooled flat-plate solar collectors were tested for thermal performance. Efficiencies were measured under two conditions: quasi steady-state during 5-minute intervals, and under constant temperature and flow for a complete day. Results are compared for five types of collector construction: 1) single cover, flat black absorber coating, 2) single cover, selective absorber coating, 3) double cover, flat black absorber coating, 4) double cover, selective absorber coating, and 5) evacuated tubular design. There is relatively close correspondence in performance among different collectors with flat black absorber coatings, but considerable variation among the performance of those with selective coatings. At 70°C inlet temperature, day-long energy collection ranged from about 20% to more than 40% of the solar radiation available. In Part II of the report, all-day test results are analyzed for variations attributable to different operating days and different inlet temperatures. During periods of steady solar irradiance, the efficiency measured under the all-day test conditions corresponded very well with the efficiency calculated from the steady-state performance results.

30566 **(FSEC-RD—79-2-Pt.2) Solar collector testing program. Part II: all-day efficiency tests. Final report.** Beach, C.D. (Florida Solar Energy Center, Cape Canaveral (USA)). 15 May 1979. Contract FG05-77ET20113. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012201.

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Twenty-five hydronic flat-plate collectors used in nationwide commercial demonstration projects were tested. In addition to the performance tests conducted according to ASHRAE 93-77 and a 30-day exposure test as described by FSEC 77-5, most of the collectors were tested for efficiency while operating for an entire day at a constant fluid inlet temperature and flow rate. All-day tests were run on 23 of the collectors at a nominal inlet temperature of 70°C, a representative operating temperature for solar space heating collectors. On the collectors with flat black absorber coatings and a single cover, another all-day test was run at 50°C inlet temperature, and the collectors with selective surfaces were tested a second time at 85°C inlet temperature. These temperatures are typical for collectors in solar water heating and air conditioning systems respectively. Part I, a separate volume of this report, contains the results of performance tests (ASHRAE Standard 93-77) before and after the non-operational exposure test, and the all-day test at 70°C. In this volume the results of 54 all-day tests on 23 of the collectors are summarized and compared to estimated all-day efficiency derived from the ASHRAE test data. Estimated efficiencies

were found to average about 5 points lower than the measured values.

30567 **Interfaces in solar energy materials.** Czanderna, A.W. (Solar Energy Res. Inst., Golden, CO). *Proceedings - Electrochemical Society;* **83-1**: 167-182(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

This paper is a summary of the importance of various methods for studying the stability of interfaces in solar energy materials and of the interfaces. An overview is given that explains why interfaces are crucially important for developing long-life, cost-effective, multilayer, polycrystalline, thin-film stacks for solar energy conversion systems (SECS). Second, broad categories of characterization methods, approaches, and processes in interface science are reviewed and related to studies required for components in SECS, in which the importance of compositional analysis of interfaces is emphasized. These include surface area, real and clean surfaces, structure and topography, interface composition or purity, surface thermodynamics, diffusion, amount adsorbed, and nature of adsorbate/solid interactions. Third, an overview is given for the solar-related research needs and opportunities in various topical areas in interface science. These topics include thin films; grain, phase, and interface boundaries; oxidation and corrosion; adhesion; chemisorption, catalysis, and surface processes; abrasion and erosion; photon-assisted surface reactions and photoelectrochemistry; and interface characterization methods. A brief review is given concerning the current status of interfacial characterization. Mention is made of typical current problems with reflector, polymer, absorber, and PV cell interfaces, specifically, and of how the interface methods can or are being applied to solar materials research.

30568 **Stability of reflectors with polymeric coatings.** Schissel, P.; Czanderna, A.W. (Solar Energy Res Inst., Golden, CO). *Proceedings - Electrochemical Society;* **83-1**: 183-201(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

One of the possible solutions for improving mirrors for long-life, inexpensive solar concentrators is to coat the reactive mirror material with a polymer. Polymer-coated reflectors may improve optical efficiency and reduce the cost of solar mirrors. Because the mirror/polymer interface may have long-term instabilities in a solar-stressed environment, it is necessary to isolate the effects attributable to the bulk materials from those of the interface. The purpose of this paper is to review the literature on one of the systems of great current interest, the silver/polymer interface. First, the components of this interface are considered separately. Studies of reactions of environmental gases with silver are summarized. Then, candidate fluoropolymers and polymethylmethacrylate are considered independently of the metal. The thermal, photo, and oxidative degradation reactions are outlined briefly.

30569 **The cleaning of float glass and how it affects the corrosion of finished mirrors.** Goggin, R.; Pohlman, S.; Russell, P. (Solar Energy Res Inst. Golden, CO). *Proceedings - Electrochemical Society;* **83-1**: 223-231(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

The basic concept of solar energy thermal conversion concentrator systems relies on the use of reflective surfaces. These are typically silvered glass mirrors made using a wet chemical process. A typical wet chemical process includes the cleaning of the float glass, sensitization with stannous chloride, application of a silver film, deposition of a copper film, and application of a protective paint coating. To evaluate the effect of each process variable, facilities were developed to duplicate the mirroring procedure. They were then utilized to provide precise control over each step. The results so far indicate that the cleaning step is most critical to the durability of the finished product. Several cleaning procedures were assessed, and utilizing a felt block with pumice as an abrasive proved to be most effective. It is thought that the pumice removes the surface "gel" layer of glass, as well as dirt, grease, and any other contaminants present, allowing better adhesion of the silver to the glass surface. A poorly prepared sheet of glass can result in a poor adhesive bond between the silver film and the glass substrate and subsequent rapid deterioration of the reflectance of the mirror.

30570 **Stress corrosion of a high-transmittance glass for solar applications.** Coyle, R.T.; McFadden, J.D.O. (Solar Energy Res Inst., Golden, CO). *Proceedings - Electrochemical Society;* **83-1**: 232-251(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

Measurements have been made of the stress corrosion coefficients A and n in the relationship v = AK /SUB I/ /SUP n/ (where v is the crack velocity and K /SUB I/ is the stress intensity) as well as of the critical stress intensity factor K /SUB IC/ , for a new flat glass for solar energy applications. It was found that this new glass, Corning Glass Works Code 7809, has an n of 26.6, versus 17.9 for soda-lime-silicate float glass. This implies that the 7809 has lower stress corrosion cracking susceptibility than the float glass. The critical stress intensity factor for the 7809 was 0.75 MPa$\sqrt{m}$ versus 0.71 for float glass.

30571 **optical properties, thermal stability and characterization of cobalt Oxide films.** Parks, J.; Call, P. (Solar Energy Res Inst., Golden, CO). *Proceedings - Electrochemical Society;* **83-1**: 269-288(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

There is currently a need in the solar energy industry to enhance the efficiency of collectors, especially concentrating collectors, which operate at temperatures above 300°C. Absorber coatings have been found to increase the efficiency of collection by reducing thermal losses caused by reradiation of heat from the collector surface. In short, the collector is coated with a black film which has a high solar absorptance (α) but is transparent to IR wavelengths, to which the metal substrate is reflective. That is, it is a selective absorber. Black chrome, a composite film of chromium metal and chromium oxides, is currently used industrially for this purpose. However, it has been found to fail at prolonged times above 350°C. Black cobalt has shown promise as an alternative for high temperature applications. This research project focused on the development of black cobalt as a selective solar absorber. The optical properties were considered as a function of various times at 400-500°C. It was also of interest to determine the chemical composition of the films because changes in optical properties in the early hours of heating were found to be associated with the oxidation of the films.

30572 **Corrosion of iron, aluminum and copper-base alloys in glycols under simulated solar collector conditions.** Beavers, J.A.; Diegle, R.B. (Battelle Columbus Laboratories, Columbus, Ohio). *Proceedings - Electrochemical Society;* **83-1**: 289-318(Oct 1981). (CONF-811013—). Contract AC04-79CS10510.

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

The corrosion behavior of iron, aluminum and copperbase alloys was studied in uninhibited glycol solutions under conditions that simulate those found in non-concentrating solar collectors. It was found that only Type 444 stainless steel exhibited adequate corrosion resistance; there was no evidence of pitting, crevice corrosion, or galvanic attack, and general corrosion rates were low. The general corrosion rate of CDA 122 copper was high (greater than 200 μm/y) under some test conditions, but copper was resistant to pitting and crevice attack. General corrosion rates of the aluminum alloys (1100, 3003 and 6061) were low, but these alloys were susceptible to pitting and crevice attack. The propensity for pitting was greatest in the presence of chlorides but it also was severe in the absence of chlorides following long exposures. The onset of pitting of the aluminum alloys in chloride-free solutions was attributed to degradation of the glycols.

30573 **The attack of stainless steel by molten aluminum in a solar concentrator.** Webb, J.; Pohlman, S.L. (Solar Energy Research Inst., Golden, CO). *Proceedings - Electrochemical Society;* **83-1**: 472-491(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

Compatibility of ASI Type 316 stainless steel with molten aluminum was studied to determine probable lifetimes of unprotected steel components exposed to the liquid aluminum used for heat transfer and storage in a point focus solar receiver. Steel samples immersed in molten aluminum showed rapid growth of hemispherical pits accompanied by an exponential increase in weight loss. Using this model, rate constants for the dissolution process were determined at 705, 760, 816, 871, and 927°C and an activation energy of 17.5 kcal/mole was calculated. An expression for the rate constant was developed enabling use of the pitting model to predict failure time envelopes for the steel receiver components at a given temperature. Maximum lifetimes of the steam coil and wall were predicted to be 94 and 172 hr at 705°C, respectively. Mean predicted lifetimes and lifetimes predicted at higher temperatures were shorter. The empirical model accurately predicted actual lifetimes of field and laboratory tested components. Since failure of the steam coil could lead to a receiver wall failure and cause uncontrolled and possibly violent release of molten aluminum, a recommendation that the receiver be operated only at temperatures well below the melting point of aluminum was made.

1420 Heat Storage

REFER ALSO TO CITATION(S) 30545, 30973

15 GEOTHERMAL ENERGY

30574 (CONF-8210125—Suppl.) Geothermal progress monitor. Special supplement: proceedings of the geothermal program review. (USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC. Geothermal and Hydropower Technology Div.). 1982. 426p. NTIS, PC A19/MF A01. Order Number DE83009736.

From Conference on the geothermal program review; Washington, DC, USA (25 Oct 1982).

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Separate abstracts were prepared for individual papers. (MHR)

1501 Resource Status And Assessment

REFER ALSO TO CITATION(S) 30256, 30584, 30587

30575 (DOE/ID/01570—T62) Geothermal energy: a brief assessment. Lunis, B.C.; Blackett, R.; Foley, D. (eds.). (EG and G Idaho, Inc., Idaho Falls (USA); Utah Univ., Salt Lake City (USA). Earth Science Lab.). Jul 1982. Contract AC07-76ID01570. 95p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012205.

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This document includes discussions about geothermal energy, its applications, and how it is found and developed. It identifies known geothermal resources located in Western's power marketing area, and covers the use of geothermal energy for both electric power generation and direct applications. Economic, institutional, environmental, and other factors are discussed, and the benefits of the geothermal energy resource are described.

1502 Geology And Hydrology Of Geothermal Systems

REFER ALSO TO CITATION(S) 30581

30576 (UCRL—53444) Chemical evolution of a high-level magma system: the Black Mountain volcanic center, southern Nevada. Vogel, T.A.; Noble, D.C.; Younker, L.W. (Lawrence Livermore National Lab., CA (USA)). Sep 1983. Contract W-7405-ENG-48. 54p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84013321.

A comprehensive study of stratigraphically controlled samples of both lavas and ash-flow tuffs from the Black Mountain volcanic center enables us to evaluate magmatic processes. The results of this study are used to: (1) determine how this high-level magma system developed; (2) compare this system with other similar systems; and (3) correlate ash-flow sheets using their chemical characteristics.

1503 Geothermal Exploration And Exploration Technology

30577 (DOE/ET/27014—T12) 1983 temperature gradient and heat flow drilling project for the State of Washington. Korosec, M.A. (Washington Div. of Geology and Earth Resources, Olympia (USA)). Nov 1983. Contract AC07-79ET27014. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012504.

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During the Summer of 1983, a three-hole drilling program was carried out to collect temperature gradient and heat flow information near potential geothermal resource target areas. The general locations of the project areas are shown. The first hole, DNR 83-1, was located within the Green River valley northwest of Mount St. Helens. This site is near the Green River Soda Springs and along the projection of the Mount St. Helens - Elk Lake seismic zone. The other two holes were drilled near Mount Baker. Hole DNR 83-3 was sited about 1/4 km west of the Baker Hot Springs, 10.5 km east of Mount Baker, while hole DNR 83-5 was located along Rocky Creek in the Sulphur Creek Valley. The Rocky Creek hole is about 10 km south-southwest of the peak. Two other holes, DNR 83-2 and DNR 83-4, were located on the north side of the Sulphur Creek Valley. Both holes were abandoned at early stages of drilling because of deep overburden and severe caving problems. The sites were apparently located atop old landslide deposits.

30578 (DOE/ET/27014—T13) Complete Bouguer Gravity Anomaly Map, Cascade Mountains, Washington. Danes, Z.F.; Phillips, W.M. (Washington Div. of Geology and Earth Resources, Olympia (USA)). 1983. Contract AC07-79ET27014. 28p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012548.

Geophysical Map GM-27.

30579 (DOE/ET/27014—T17) Targeting geothermal exploration sites in the Mount St. Helens area using soil mercury surveys. Holmes, J.; Waugh, K. (Washington Div. of Geology and Earth Resources, Olympia (USA)). Nov 1983. Contract AC07-79ET27014. 35p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012547.

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The background mercury level was determined for the areas studied, providing preliminary information for future work. Identification of areas which might merit more intensive sampling was also accomplished. The clusters of samples with high Hg concentrations in both areas may indicate high heat flow and should be investigated further. Problems involving the use of this method in the Cascades were also identified. Both areas north and south of the mountain had approximately the same standard deviation (expressed as a percentage of the mean), even though the sampling horizons seemed much more consistent and less disturbed in the Marble Mountain area than in the Green River Soda Springs area. This may indicate that for these areas, secondary controls are more important, or that Hg anomalies are much smaller than indicated in studies of other areas.

30580 (DOE/ET/28365—21) Helium and ground temperature surveys at Steamboat Springs, Colorado. Special Publication 21. McCarthy, K.P.; Been, J.; Reimer, G.M.; Bowles, C.G.; Murrey, D.G. (Colorado Geological Survey, Denver (USA)). 1982. Contract AS07-77ET28365. 16p. NTIS, PC AO2/MF A01; 1; GPO Dep. Order Number DE84012501.

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As demonstrated in Steamboat Springs, Colorado, helium and shallow temperature surveys are quick, inexpensive geothermal exploration methods that can be used together with excellent results

in an urban environment. Steamboat Springs, in northwestern Colorado, lies primarily upon terrace gravels and alluvium with the major structure being a north-trending normal fault passing through the western portion of the city. Work by Christopherson (1979) indicates that the Steamboat warm springs are not laterally connected at shallow depth with Routt Hot Springs, 10 Km (6 mi) to the north, although both resource areas are fault controlled. A shallow temperature survey was conducted in the city to determine the usefulness of this method to delineate a low temperature resource. Several extraneous factors influencing shallow temperature measurements were dealt with by field technique or subsequent analysis. A helium survey was conducted to compare with temperature results. Sixty-two soil helium samples were taken, using an interval of .1 to .2 Km (.06 to .12 mi), twice the density of the 18 temperature probe stations. A mobile spectrometer allowed immediate analysis of helium samples. The contoured data from each method correlate well spatially and indicate that two faults control the resource in Steamboat Springs. Although these surveys should always be used to supplement other data, their utility in this study was readily apparent.

30581 **(DOE/ID/12026—T4) Cody hydrothermal system.** Heasler, H.P. (Wyoming Univ., Laramie (USA). Dept. of Geology and Geophysics). 1982. Contract FC07-79ID12026. 13p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84013411.

The hot springs of Colter's Hell are the surface manifestations of a much larger hydothermal system. That system has been studied to define its extent, maximum temperature, and mechanism of operation. The study area covers 2700 km² (1040 mi²) in northwest Wyoming. Research and field work included locating and sampling the hot springs, geologic mapping, thermal logging of available wells, measuring thermal conductivities, analyzing over 200 oil and gas well bottom-hole temperatures, and compiling and analyzing hydrologic data. These data were used to generate a model for the hydrothermal system.

30582 **(DOE/ID/12079—90) Resistivity, induced polarization, and self-potential methods in geothermal exploration.** Ward, S.H.; Sill, W.R. (Utah Univ., Salt Lake City (USA)). 1982. Contract AC07-79ID12079. 105p. (ESL—108). NTIS, PC A06/MF A01; GPO Dep. Order Number DE84012191.

An overview of the literature is presented. This is followed by a statement of some elementary electromagnetic theory necessary to establish the MKS system of units and the fundamental physics governing electrical methods of exploration. Next there is presented a reasonably detailed discussion of the electrical properties of earth materials including normal mode of conduction, surface conduction, electrode polarization, membrane polarization, semiconduction, melt conduction, real and complex resistivity, and the origin of self-potentials in geothermal systems. To illustrate how electrical methods are used within the framework of integrated geological, geochemical, and geophysical exploration, the case history of the Monroe-Red Hill hot springs system is presented.

30583 **(DOE/SF/11956—1) Drilling and thermal gradient measurements at US Marine Corps Air Ground Combat Center, Twentynine Palms, California. Final report, October 1, 1983-March 31, 1984.** Trexler, D.T.; Flynn, T.; Ghusn, G. Jr. (Nevada Univ., Las Vegas (USA). Div. of Earth Sciences). 1984. Contract AC03-83SF11956. 86p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012803.

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Seven temperature gradient holes were drilled at the Marine Corps Air Ground Combat Center, Twentynine Palms, California, as part of a cooperative research and development program, jointly funded by the Navy and Department of Energy. The purpose of this program was to assess geothermal resources at selected Department of Defense installations. Drill site selection was based on geophysical anomalies delineated by combined gravity, ground magnetic and aeromagnetic surveys. Temperature gradients ranged from 1.3°C/100 m (1°F/100 ft.) in hole No. 1 to 15.3°C/100 m (8.3°F/100 ft.) in temperature gradient hole No. 6. Large, positive geothermal gradients in temperature gradient holes 5 and 6, combined with respective bottom hole temperatures of 51.6°C (125°F) and 67°C (153°F), indicate that an extensive, moderate-temperature geothermal resource is located on the MCAGCC. The geothermal reservoir appears to be situated in old, unconsolidated alluvial material and is structurally bounded on the east by the Mesquite Lake fault and on the west by the Surprise Spring fault. If measured temperature gradients continue to increase at the observed rate, temperatures in excess of 80°C (178°F) can be expected at a depth of 2000 feet.

30584 **(LA-UR—84-1426) Economics and applications of geothermal energy in St. Lucia.** Altseimer, J.H.; Burris, A.E.; Edeskuty, F.J.; Trocki, L.K.; Williamson, K.D. Jr. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 21p. (CONF-840503—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012663.

From Conference on energy for small and middle sized countries; Tel Aviv, Israel (13 May 1984).

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The assessment reported here consisted of three major tasks: first, a field geologic assessment of the physical extent of the Qualibou caldera geothermal resource; second, an engineering evaluation of the potential development of the geothermal resource; and third, a study of the potential economic impact upon St. Lucia associated with the development of the geothermal resource. The first task, the geologic assessment, is not discussed in detail.

30585 **(LBL—17650) Porosity of coastal deltaic sandstones, Cerro Prieto geothermal field, Baja California, Mexico.** Vonder Haar, S.P. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 7p. (CONF-840809—14). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012249.

From Geothermal Resources Council annual meeting; Reno, NV, USA (27 Aug 1984).

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Core porosity values for sandstones and density log-derived porosities for sandstone-siltstone-shale sequences indicate a range from less than 1% to 40% at the Cerro Prieto geothermal field, Baja California, Mexico. Mean porosity values indicate that a general trend of decreasing porosities with increasing depth from 35% at 600 m to 10% at 2300 m is complicated by the 15 to 30% porosities in the 350°C hot water zone at about 2700 m depth. Scanning electron microscopy documents secondary dissolution porosity, mineral overgrowths, and abundant clay minerals. Core permeability ranges from 0.1 to 1000 millidarcies for the more than 50 cores studied. The porosity variability indicates that geothermal systems provide an ideal setting for testing concepts of dissolution porosity and increased secondary dissolution permeability that could be useful for nuclear waste storage as well as petroleum reservoir engineering.

30586 **(PNL—3857) Development of a high temperature pH electrode for geothermal fluids. Final report, Task 1.** Niedrach, L.W.; Stoddard, W.H. (General Electric Co., Schenectady, NY (USA). Corporate Research and Development Dept.). Apr 1981. Contract AC06-76RL01830. 62p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84012337.

There has been no serious application of pH measurements above 150°C stemming from the fact that there have been no practical probes available that are capable of operation under the required conditions of temperature and pressure. Recently, a new approach to such measurements was developed in which an oxygen ion conducting ceramic membrane (e.g., stabilized zirconia) is being employed in a sensor somewhat analogous to the glass electrode. The new sensor retains the specificity of the glass electrode, is equally insensitive to interference from redox active species, and possesses markedly superior resistance to attack by aqueous media at high temperatures. The status of the new sense at the inception of the contract is summarized and plans for the first year's investigation are outlined.

1505 Economic And Financial Aspects

30587 **Geothermal energy and applications.** Bloomster, C.H.; Fassbender, L.L. (Battelle, Pacific Northwest Laboratories Richland, Washington). pp 47-86 of International symposium-workshop on renewable energy sources. Bhatty, M.K. Coral Gables, FL; Clean Energy Research Inst. (1983). (CONF-8303103—).

From International symposium on renewable energy sources; Lahore, Pakistan (18 Mar 1983).

Geothermal energy occurs in a wide variety of forms, some of which are much more valuable than others. Temperature and depth are key measures of value. Geothermal energy is widely distributed. High-temperature resources suitable for electricity generation occur in areas of geologically recent volcanism. Low-temperature resources suitable for direct uses, such as space and process heating, may exist everywhere. Geothermal fluids have a low energy content compared to fossil fuels. They cannot be transported very far economically and must be used near their origin. The technology for using geothermal energy is well developed; however, technology improvements are under development that promise to lower costs and increase the use of geothermal energy. Geothermal energy is commercially exploitable on a small scale, making it applicable for remote regions and isolated applications.

1506 Environmental Aspects And Waste Disposal

30588 **Health implications of unconventional energy production and use.** Watson, A.P.; Etnier, E.L.; Walsh, P.J. (Health and Safety Research Division Oak Ridge National Laboratory, Oak Ridge, Tennessee). *Alternative Energy Sources;* 9: 249-278(Dec 1980). (CONF-801210—). Contract W-7405-ENG-26.

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

An evaluation of potential occupational and public health aspects of geothermal, biomass, solar, and synfuel energy technologies has been performed. Identification of potentially hazardous processes of each fuel cycle has been made, as well as development of quantitative evaluation when necessary data were available. Occupational exposure to hydrogen sulfide gas occurs near all geothermal sites and whenever organic matter decomposes anaerobically. Respiratory damage has occurred to laborers in geothermal fields, and farm workers have been killed when employed near agitating liquid manure systems. However, the most frequent and severe reported injury to geothermal workers is dermal exposure to caustic sludges produced by H_2S abatement systems. Principal health and safety considerations of biomass pathways are directly related to the diffuse nature of solar energy fixation by photosynthesis and subsequent transfer to animal food chains. A significant potential for occupational injuries and fatalities exists. Of all biomass systems evaluated, direct burning of solid fuels presents the greatest public health risk. Unique hazards associated with solar energy include occupational exposures to Cd and Ga during manufacture of photovoltaic cells, and exposure to microwaves during development and operation of a satellite power system. Public health exposures to indoor air pollutants may increase in weatherized homes that are passively heated and cooled. Potential occupational hazards during production of synfuels from coal and oil shale include dermal and inhalation exposures to carcinogens, teratogens, and caustic agents. The epidemiologic history of synfuel workers is reviewed and mitigation strategies for future development are recommended.

1508 Geothermal Power Plants

30589 **(CONF-8010341—) Use of geothermal energy for electric power generation. Workshop proceedings.** Mashaw, J.M.; Prichett, W. III (eds.). (National Rural Electric Cooperative Association, Washington, DC (USA)). 1980. Contract FG07-80ID12189. 122p. NTIS, PC A06/MF A01. Order Number DE83016591.

From Use of geothermal energy for electric power generation workshop; San Diego, CA, USA (21 Oct 1980).

Separate abstracts were prepared for individual papers. (MHR)

1509 Geothermal Engineering

30590 **(EGG-M—03884) Monitor well responses at the Raft River, Idaho, Geothermal Site.** Skiba, P.A.; Allman, D.W. (Idaho National Engineering Lab., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 15p. (CONF-8405144—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012652.

From International groundwater symposium; Montreal, Quebec, Canada (21 May 1984).

Effects of geothermal fluid production and injection on overlying ground-water aquifers have been studied at the Raft River Geothermal Site in southcentral Idaho. Data collected from 13 monitor wells indicate a complex fractured and porous media controlled ground-water flow system affected by natural recharge and discharge, irrigation withdrawal, and geothermal withdrawal and injection. The monitor wells are completed in aquifers and aquitards overlying the principal geothermal aquifers. Potentiometric heads and water quality are significantly affected by natural upward geothermal leakage via faults and matrix seepage. No significant change in water quality data has been observed, but potentiometric head changes resulted due to geothermal resource testing and utilization. Long-term hydrographs for the wells exhibit three distinct patterns, with superimposed responses due to geothermal pumping and injection. Well hydrographs typical of the Shallow aquifer exhibit effects of natural recharge and irrigation withdrawals. For selected wells, pressure declines due to injection and pressure buildup associated with pumping are observed. The latter effect is presumably due to the elastic deformation of geologic material overlying the stressed aquifers. A second distinct pattern occurs in two wells believed to be hydraulically connected to the underlying Intermediate aquifer via faults. These wells exhibit marked buildup effects due to injection as well as responses typical of the Shallow aquifer. The third pattern is demonstrated by three monitor wells near the principal production wells. This group of wells exhibits no seasonal potentiometric head fluctuations. Fluctuations which do occur are due to injection and pumpage. The three distinct hydrograph patterns are composites of the potentiometric head responses occurring in the various aquifers underlying the Raft River Site.

30591 **(LBL—14270) Nonisothermal effects during injection and falloff tests.** Benson, S.M.; Bodvarsson, G.S. (Lawrence Berkeley Lab., CA (USA)). Sep 1982. Contract AC03-76SF00098. 47p. (CONF-820927—9). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012250.

From 57. AIME Society of Petroleum Engineers annual technical conference and exhibition; New Orleans, LA, USA (26 Sep 1982).

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The results show that to correctly analyze pressure transients governed by a moving thermal front, the values used for the fluid properties must correspond to the temperature of the injected fluid. On the other hand, for pressure falloff tests and for injection tests conducted in a well cooled by previous injection or drilling, the physical properties of the in situ reservoir fluids must be used. It is also shown that the application of conventional isothermal methods for calculating skin values from injection and falloff data will give erroneous results. A new method is presented for calculating skin values from injection and falloff data that accurately corrects for nonisothermal effects. A number of detailed examples are given that illustrate the suggested method of analysis. The technique is applied to the analysis of injection test data from a well located in the East Mesa geothermal field in southern California.

1510 Direct Energy Utilization

30592 **(P—500-83-12) Feasibility of geothermal direct use applications in San Bernardino, California. Final report.** Wessel, H.B.; Kersey, B.C.; Stejskal, J.F.; Cunniff, R.A.; Houghton, C.; Glazner, G.; Huttrer, G.; Stewart, C.H.; Stewart, E. (San Bernardino Municipal Water Dept., CA (USA)). May 1983. 107p. California Energy Commission, 1516 Ninth St.-MS-13, Sacramento, CA 95816. Order Number TI84901069.

This report analyzes the feasibility of geothermal direct use applications in San Bernardino, California. It concludes that a demonstration geothermal district heating system is technically and economically feasible. A geothermal resource is available with measured temperature of 130 to 134°F, flow rates from individual wells of up to 4500 gallons per minute, and less than 300 milligrams per liter of dissolved minerals. The Phase I distribution system could supply 28 potential public and private sector customers with 3500 gallons per minute of the resource to replace 1,276,000 therms of natural gas annually. Water heating bills using geothermal energy would be 44 percent less than for natural gas, allowing most private sector users to recover their retrofit costs within three to five years. Ownership and operation of the geothermal district system would be one of the utility functions of the San Bernardino Municipal Water Department. The district heating system can be constructed and operated using proven technology and off-the-shelf components. No technical or environmental obstacles impede development. The financial impediment to development has been overcome by a legislatively authorized grant/loan of $2,750,000 from the California Energy Commission to be repaid with interest from system revenues within ten years.

17 WIND ENERGY

1701 Availability (climatology)

REFER ALSO TO CITATION(S) 30595

30593 **(BMFT-FB-T—83-310) Development of a simple wind speedometer for application in countries of the developing world.** Grundmann, R.; Hallmann, W.; Schaefer, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 137p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84751245.

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The aim was to develop a Wind Measuring Apparatus (WTA), which as opposed to known wind velocity indicators will record wind energy respectively wind power over longer periods. On the basis of the measurement data a decision can be made as to the location of a wind mill generator (e.g. to pump water). A favourably priced WTA has been developed which, related to the measurement interval will yield the following data: a) device specific wind energy, b) equivalent average wind velocity, c) equivalent average wind power. The device uses a constant breaking torque which can be adjusted so that measurements will only start at a predetermined minimum wind velocity. If desired a mechanically operating switch can be installed which will interrupt the recorcing at a present maximum wind velocity. The required objective has been accomplished satisfying the following conditions: a) favourable manufacturing costs, b) mechanically operating device independent of an external energy source. Using this device locations can be tested at low costs as to their suitability for a wind power station. The Wind Testing Apparatus has already been tried successfully under severe wheather conditions at various locations over extendet periods (2 1/2 years).

30594 **(NYSERDA—83-16) High yield wind energy resources in the mid-Hudson River basin. Final report.** Sforza, P.M.; Smorto, M.J.; Bailey, B.; Wheeler, R. (Flowpower, Inc., Huntington Station, NY (USA); Atmospheric Sciences Research Center, Albany, NY (USA)). Dec 1983. 111p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223. Order Number TI84901159.

An evaluation of high-yield wind energy resources in the franchise area of the Central Hudson Gas and Electric Corporation is presented. A site screening process was used to select seven sites for field tests. Wind data taken at those sites for three months were used as the basis to select four sites for an additional testing period of nine months. A computer simulation was conducted on the performance of eight wind turbines (55 kW to 7350 kW) at the four sites based on the one year data recorded; the results of the computer runs are described. Also, an economic analysis of the operation of the eight wind turbines at the windiest site is presented. Recommendations for wind energy development in the region are discussed.

1704 Economics

30595 **(DOE/CH/00178—T21) Wind energy: a brief assessment.** (Solar Energy Research Inst., Golden, CO (USA)). Jun 1983. Contract AC02-77CH00178. 48p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012208.

This document includes discussions about wind energy technology, its applications, technical and economic performance, future developments, and legal and environmental issues. Maps showing the general locations of good wind power resources are also presented. This information can be used to screen out unpromising applications and to key into more detailed, local wind resource data. Sources of further information are listed.

1705 Environmental Aspects

30596 **(RISO-M—2411) Note on wind generator interaction.** Jensen, N.O. (Risoe National Lab., Roskilde (Denmark)). Nov 1983. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84751455.

A simple model for the wake behind a wind generator is given. The model is compared to some full scale experimental results. The model is then used in an example where the production from a circular cluster of 10 wind generators is calculated. Next the simple wake model is extended to deal with a number of aligned generators, and finally an example is given where the production from a linear cluster of 10 generators is calculated.

1706 Wind Energy Engineering

REFER ALSO TO CITATION(S) 30593, 30594, 31382

30597 **(BMFT-FB-T—83-306) Examination of the final design of the rotor blades GROWIAN I.** Lehmhus, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 61p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84751248.

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The rotor blades for the 3 MW wind energy converting system Growian I were developed and constructed by Maschinenfabrik-Augsburg-Nuernberg AG (MAN) by order of the Federal Ministry of Research and Technology. The project described below was aimed at supervising the MAN project regarding technical safety from the beginning of the development phase up to completion of the rotor blades. The scope of work covered the examination of stress and vibration calculations and of design and production data, as well as the testing of materials. The results obtained from experimental studies of components and type tests of materials, partly performed by MAN and partly required by Germanischer Lloyd, were taken into account in the assessment. The rotor blades were constructed and assembled under the supervision of Germanischer Lloyd.

30598 **(DOE/RL/01830—T18) United States annual average wind power.** (Pacific Northwest Lab., Richland, WA (USA)). 1984. Contract AC06-76RL01830. 15p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012215.

This wind resource map, produced by Pacific Northwest Laboratory for the US Department of Energy, is based on a synthesis of 12 regional assessments covering the United States and its territories. For each region, wind resource assessments are presented in the form of an atlas. The atlases depict in graphic, tabular and narrative form the wind resource on a regional and state level. Local terrain features may interact with the windfield to cause the wind power to vary as much as +-50% to 100% from the assessment value. Thus, there may be local areas of high wind power in regions estimated to have low wind power; conversely, some local areas may have lower wind power than that shown by this assessment. Maps depicting the degree of certainty of these assessment

values are also available and should be used in combination with this wind resource map.

30599 **(ECN—156) Electrical performance of the 'Pionier I' 15 m VAWT.** Machielse, L.A.H. (Stichting Energieonderzoek Centrum Nederland, Petten). Apr 1984. 26p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84751589.

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The performance testing of a vertical axis wind turbine (VAWT) with a rotor diameter of 15 m and troposkien blades is described. At different, constant rotor speeds (30, 40 and 50 rpm) the electrical performance coefficient and the electrical power coefficient were measured with the bin method. Graphs are presented for the resulting power curves, performance coefficients and power coefficients with and without correction for the lack of correlation between the anemometer wind speed and the wind speed 'seen' by the turbine. A comparison is made between measured and predicted power coefficients taking into account estimated losses. From the results the optimum tip speed ratio and the potential energy yield of this turbine have been established. (A.V.)

30600 **(FRNC-TH—1515) Aerodynamic study of a Savonius rotor.** Botrini, M. (Aix-Marseille-2 Univ., 13 - Marseille (France)). Sep 1982. 154p. (In French). NTIS (US Sales Only), PC A08. Order Number DE84751550.

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A study of the aerodynamic field of a Savonius wind power engine is presented, and more particularly, the description of a Savonius rotor mock-up in a wind tunnel. This study includes records of pressures, and velocity profiles and measurement of turbulent fluctuations. The results include also the visualization of flows in hydrodynamic calculations. A calculation of the power coefficient is suggested from pressure distributions on the turbine blades, and a comparison with the experimental results is presented.

30601 **(P—500-83-017) Wind prospecting in San Diego County, California.** Anderson, R.S.; Murphy, R.A. (Meteorology Research, Inc., Altadena, CA (USA)). Aug 1983. 26p. California Energy Commission, 1516 9th Street, MS-13, Sacramento, CA 95814. Order Number TI84901070.

This Interim Report summarizes the site selection and first six months of data collection for a wind prospecting study which Meteorological Research, Inc., conducted in San Diego County, California. Existing wind data were compiled and analyzed in order to identify areas with potential for wind energy development. Thirty sites were assessed for land use and environmental restraints. Of these 30, 18 were selected for a 1-year monitoring of wind speed and direction. Preliminary results indicate that three areas exist in San Diego County with commercial wind resource potential. All of the areas are located in the eastern portion of the county. Only one of the three, the In-Ko-Pah Gorge-Table Mountain area of Southeastern San Diego County, appears to offer significant land area and freedom from major environmental restraints to be classified as a significant area for potential wind farm development.

30602 **(PNL—4895) Wind shear for large wind turbine generators at selected tall tower sites.** Elliott, D.L. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76RL01830. 81p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84011790.

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The objective of the study described in this report is to examine the nature of wind shear profiles and their variability over the height of large horizontal-axis wind turbines and to provide information on wind shear relevant to the design and opertion of large wind turbines. Wind turbine fatigue life and power quality are related through the forcing functions on the blade to the shapes of the wind shear profiles and their fluctuations over the disk of rotation.

30603 **(PNL—5024) Meteorological analysis for clusters of wind turbines.** Powell, D.C. (Pacific Northwest Lab., Richland, WA (USA)). May 1984. Contract AC06-76RL01830. 53p. NTIS, PC A04//MF A01; GPO Dep. Order Number DE84013164.

A demonstration qualifying the meteorological spectral gap hypothesis is given. It is shown that the peak in the micrometeorological frequency range is at an anomalous level according to a demonstration made using a state-of-the-art micrometeorological spectrum. A spectral model for calculation of rms values for the unstable atmosphere is presented. It is found that theoretically the rms of the unstable atmosphere is about 1.7 times that of the neutral atmosphere when the frequency band considered is one cycle per 30 minutes to one cycle per minute. A spectral model for spatial correlation in neutral conditions is suggested. It is based on Fourier transformation of the above-mentioned spectrum.

30604 **(RFP—3564) Fatigue modeling for small wind systems: basic theory.** Waldon, C.A.; Hansen, A.C. (Rockwell International Corp., Golden, CO (USA). Wind Energy Research Center). Jun 1983. Contract AC04-76DP03533. 56p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84013191.

This report discusses the theory of fatigue as applied to horizontal-axis wind systems and reviews current techniques for predicting fatigue loads and fatigue life. Wind systems are subjected to a complex and diverse variety of loads, ranging from simple gravity and centrifugal loads to complex and random wind loads. The categories of loads described here include transient, periodic, and control-induced loads, as well as loads induced by severe aeroelastic instabilities. Within these categories, load types include centrifugal, aerodynamic thrust and torque, parked rotor survival loads, gravity loads, gyroscopic loads, and aerodynamic loads induced by crossflow or yaw motion. Control systems can impose loads whenever they are activated. Catastrophic failure can result from severe aeroelastically-induced loads caused by flutter. Techniques available for predicting fatigue loads include various aerodynamic performance codes (such as PROP) and simplified methods for calculating the convection of the vortex wake. MOSTAB, an aeroelasticity computer code, treats all major load sources. Results using this code are shown to be fairly comparable to experimental data in the case of a rigid-bladed wind system. Fatigue life of a machine component can be predicted during design by several techniques, including the strength-of-materials method, the fatigue curve method, and the fatigue event method. The theories of Miner, Manson, and Corten-Dolan can be used to predict fatigue life based on test data and operational experience. A fatigue research project to be performed at Rocky Flats will attempt to resolve whether any of these theories or a combination of theories can be used with an acceptable degree of accuracy in predicting fatigue loads and life for wind systems. An appendix to the report provides sample calculations of fatigue load magnitudes made using available methods.

30605 **(SAND—84-0924C) NASTRAN-based computer program for structural dynamic analysis of horizontal axis wind turbines.** Lobitz, D.W. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 10p. (CONF-8405153—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011257.

From Horizontal-axis wind turbine technology conference; Cleveland, OH, USA (8 May 1984).

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This paper describes a computer program developed for structural dynamic analysis of horizontal axis wind turbines (HAWTs). It is based on the finite element method through its reliance on NASTRAN for the development of mass, stiffness, and damping matrices of the tower and rotor, which are treated in NASTRAN as separate structures. The tower is modeled in a stationary frame and the rotor in one rotating at a constant angular velocity. The two structures are subsequently joined together (external to NASTRAN) using a time-dependent transformation consistent with the hub configuration. Aerodynamic loads are computed with an established flow model based on strip theory. Aeroelastic effects are included by incorporating the local velocity and twisting deformation of the blade in the load computation. The turbulent nature of the wind, both in space and time, is modeled by

adding in stochastic wind increments. The resulting equations of motion are solved in the time domain using the implicit Newmark-Beta integrator. Preliminary comparisons with data from the Boeing/NASA MOD2 HAWT indicate that the code is capable of accurately and efficiently predicting the response of HAWTs driven by turbulent winds.

30606 **Effect of site wind characteristics on energy production.** Pennell, W.T.; Wegley, H.L. (Atmospheric Sciences Department, Pacific Northwest Laboratory, Richland, Washington). *Alternative Energy Sources;* **4**: 3-20(Dec 1980). (CONF-801210—). Contract AC06-76RL01830.

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

The effect of differences in wind characteristics on estimates of wind turbine performance has been examined. Net energy production over a given period can be estimated if both the performance characteristics of the turbine and the wind speed probability density function (PDF) are known. Simulations covering a range of PDFs and machine performance characteristics showed that reasonable estimates of net energy production can be made using simple, analytic PDFs. The analytic PDFs only require knowledge of the average wind speed at a site. Some wind energy applications require knowledge of how temporal variations in turbine output interact with temporal variations in the load. The effect of variations in the diurnal modulation of wind speed on load matching was examined by simulating the energy transfer between a utility and a residence equipped with a small wind turbine generator. Turbine performance was simulated at six sites having a wide range of diurnal characteristics. The simulations showed that for a given turbine, a given average wind speed, and a residential-type load, large differences in diurnal characteristics had minimal effects on energy transfers between the house and the utility. This suggests that only approximate knowledge of the diurnal behavior of the wind speed is required when evaluating residential applications of wind turbine generators.

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30607 **(CONF-840423—1) Operational and design considerations for electric distribution systems with dispersed storage and generation (DSG).** Rizy, D.T.; Jewell, W.T.; Stovall, J.P. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 9p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012349.

From Transmission and distribution conference and exposition; Kansas City, MO, USA (29 Apr 1984).

This paper discusses the operational and planning problems associated with connecting small power sources to an electric distribution system. Three studies have determined the adequacy of the electric utility industry's traditional practices, hardware, and design for the operation of dispersed storage and generation (DSG) devices. The purpose of this paper is to summarize the important results of these studies and related studies, give recommendations for accommodating this new technology, and identify areas needing further research.

30608 **(NYSERDA—84-6) Protection of New York State Electric Utility Distribution Systems containing decentralized storage and generation devices. Final report.** (General Electric Co., Malverne, PA (USA). Power Systems Management Business Dept.). Nov 1983. 28p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223. Order Number TI84901160.

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Purpose of this study was to investigate the protection and personnel safety issues associated with the wide-scale integration of decentralized storage generation (DSG) equipment into the distribution systems of New York State electrical utilities. A survey of New York State utilities was made to determine requirements of the utilities for customer-owned generation in the protection and safety areas in September 1983. Appendices describe the generic protection schemes for the distribution system and DSG for seven fundamental DSG arrangements, including synchronous generators, induction generators, and inverter systems. Alternative protection philosophies are also described.

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REFER ALSO TO CITATION(S) 30143, 30215, 30490, 30689, 30690, 30693, 30702, 30757, 31041, 31104, 31106, 31120, 31416, 31468, 31677

30609 **(ANL/CNSV-TM—134-Vol.1) Study of existing RDF-cofiring experience. Volume 1. Phase I. Final report.** Fiscus, D.E.; Ege, H.D.; Petersen, R.D.; Glaub, J.C.; Savage, G.M.; Joensen, A.W. (Midwest Research Inst., Kansas City, MO (USA)). Oct 1983. Contract W-31-109-ENG-38. 89p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84013195.

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This study of existing refuse derived fuel (RDF) cofiring experience assembled all the relevant data from the actual experiences of RDF in electric utility suspension fired or cyclone fired boilers at nine locations. These nine locations represent all the electric utility cofiring experience except the early Ames experience in stoker boilers before Ames Unit 7 commenced commercial firing of RDF. This cofiring experience represents an order of magnitude of unit size from 35 to 364 MW. Ames and Madison are the only two commercial operations, as they are no longer in the start-up mode and are routinely firing RDF. All the utilities were visited, and questionnaires were assembled for both the electric utility and RDF processing plants and completed from the available literature references and information obtained from the boiler manufacturers and the various facilities. The RDF processing plant questionnaires were mailed to each plant location for verification of data. This was not done for the utilities, as a site visit was made to each location.

30610 **(BARC—1172) Comparative study of parameters used in design and operation of desalination experimental facility versus the process parameters in a commercial desalination plant.** Hanra, M.S.; Verma, R.K.; Ramani, M.P.S. (Bhabha Atomic Research Centre, Bombay (India)). 1982. 24p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701705.

Desalination Experimental Facility (DEF) based on multistage flash desalination process has been set up by the Desalination Division of the Bhabha Atomic Research Centre, Bombay. The design parameters of DEF and materials used for various equipment and parts of DEF are mentioned. DEF was operated for 2300 hours in six operational runs. The range of operational parameters maintained during operation and observations on the performance of the materials of construction are given. Detailed comparison has been made for the orocess parameters in DEF and those in a large size plant.

30611 **(EPRI-AP—3495) Reliability, availability, and maintainability audit of the T.H. Wharton Plant, Units 3 and 4, Houston Lighting and Power. Final report.** Young, R.C. (Arinc Research Corp., Annapolis, MD (USA)). May 1984. 116p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920333.

This report presents the results of an on-site reliability, availability, and maintainability (RAM) audit of the Houston Lighting and Power T.H. Wharton Plant, Units 3 and 4. Outage reports from January 1978 through October 1982 were analyzed. Overhaul activities on three combustion turbines were observed, and plant personnel were informally interviewed. Objectives of the audit were as follows: observe overhaul activities to identify RAM characteristics of plant equipments, including service lives; review plant records to determine root causes of unavailability; and investigate relationships between operation/maintenance practices and RAM characteristics. The project established a framework for performance of RAM audits.

30612 **(EPRI-CS—3272) Failures and inspections of fossil-fired boiler tubes: 1983 conference and workshop.** Richman, R.H.; Rettig, T.W. (eds.). (Aptech Engineering Services, Inc., Palo Alto, CA (USA)). Dec 1983. 576p. (CONF-8304157—). EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104.

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

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Separate abstracts were prepared for papers presented in the following areas: (1) Tube Failures from the Utility Viewpoint; (2) Failure Modes and Causes; (3) Effect of Operating Parameters on Failures and Nondestructive Examination (NDE); (4) Inspections and NDE by Contractors; and (5) Inspection and NDE by Utilities.

30613 (EPRI-CS—3272, pp 1.4-1.18) **Boiler tube failures: The Number One availability problem for utilities.** Armor, A.F. (Electric Power Research Inst., Palo Alto, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The single most significant cause of fossil plant unavailability is boiler downtime for the repair of tube leaks. Boiler tube failures conservatively account for a 4% annual loss in large fossil unit availability on a national basis. This represents an annual cost penalty of more than $500 million. More than 80% of boiler tube outages are forced. The issues this workshop address include: (1) Failure Modes and Causes: The causes of premature tube failures are varied and include waterside corrosion/erosion, fireside corrosion/erosion, overheating, dissimilar weld cracking, and tube wastage. In turn, these causes are impacted by water chemistry, burner firing patterns and boiler slagging and fouling; and (2) Inspections: The detection of tube failures at an early stage is complicated by the total area to be inspected. Varying techniques for off-line inspections are available, but definition of what defects are observable, what time is required, and how the techniques can be most effectively used are needed. Inspection on-line, using acoustic listening devices or other means, is a relatively new but promising area.

30614 (EPRI-CS—3272, pp 1.19-1.40) **Workshop questionnaire on Nondestructive Examination (NDE) of boiler tubes.** Rettig, T.W. (Aptech Engineering Services, Inc., Palo Alto, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

During the process of organizing the workshop, a questionnaire was sent out to various utility personnel. It was hoped that the questionnaire would provide information that could be used to gauge the interest of the participants and focus the workshop. The report is a summary of the approximately 60 responses received. This effort should not be construed to be a complete analysis of the state-of-the-art of nondestructive inspection (NDE) of boiler tubes. However, it does point out the major areas of concern, the techniques currently in use, and the problems associated with these techniques.

30615 (EPRI-CS—3272, pp 2.1-2.19) **Canada's boiler tube failure experience.** Dooley, R.B. (Ontario Hydro, Toronto). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

A clear requirement for boiler tube failure (BTF) analysis in the early 1970's led Ontario Hydro to introduce a BTF reporting system. A similar system was introduced across Canada in 1980 with nine participating utilities. Analysis of the data has subsequently indicated the major failure areas. These have been used to formulate programs to understand and identify the metallurgical and root cause of the failures.

30616 (EPRI-CS—3272, pp 2.20-2.32) **TVA's boiler tube failure reporting system and evaluation.** Messer, G.L. (Tennessee Valley Authority, Chattanooga). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

TVA operates 63 fossil-fired generating units ranging in size from 60 to 1300 MW with a total fossil capacity of approximately 17,000 MW. In the early 1950's when the system was expanding, management realized that a central method for recording boiler tube failure information was necessary. A tube failure reporting form was implemented at that time. The form was designed to include information needed to evaluate tube problems. The tube failure reports were kept on file at the respective plants and in the central maintenance office and were reviewed before each scheduled outage or at any time thought necessary because of an excessive number of failures. In later years, several revisions have been made in the reporting system, and the evaluation process has been greatly improved. The current reporting and evaluation system is included in this paper.f-line inspections are available, but definition of what defects are observable, what time is required, and how the techniques can be most effectively used are needed. Inspection on-line, using acoustic listening devices or other means, is a relatively new but promising area.

30617 (EPRI-CS—3272, pp 2.33-2.74) **Waterwall tube failure analysis at New Boston Station of Boston Edison Company.** Adams, R. Sr.; Flaherty, P. Sr.; Tome, A.E. (Boston Edison Co., MA; Wood-Leaver and Associates, Inc., Monroeville, PA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The New Boston units of the Boston Edison system have experienced many tube failures since they began operation in the mid 1960's. A significant portion of the failures have been due to overheating. An investigation into the root cause of the overheating failures was initiated by Boston Edison in cooperation with the Electric Power Research Institute and Wood-Leaver and Associates. This report discusses the operational history of the units and describe those factors which contributed to the overheating problem. The report also discusses boiler modifications that were performed to correct design deficiencies as well as operating procedures instituted to alleviate tube overheating and subsequent tube failure.

30618 (EPRI-CS—3272, pp 2.75-2.90) **Accelerated waterwall tube wastage and failures at the Morgantown Generating Station.** Niemann, K. (Potomac Electric and Power Co., Aquasco, MD). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

This paper is intended to document and review the incidence of accelerated furnace waterwall tube wastage and failures at Pepco's Morgantown Generating Station. A review of unit design and operating conditions is provided, and a description of the problem and identified failure modes presented. The results of extensive metallurgical analyses are discussed, as well as our efforts to control and eliminate the problem.

30619 (EPRI-CS—3272, pp 2.91-2.96) **Hydrogen damage - hopefully in retrospect.** Ball, C.H. (Mississippi Power Co., Gulfport). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

This paper tells the story of hydrogen damage on one unit at one plant and the steps taken to resolve the problem. The entire process from the first catastrophic event to a reasonably sure resolution encompassed approximately three years. This paper is an overview and not an attempt to document the details of the entire exercise.

30620 (EPRI-CS—3272, pp 3.1-3.17) **Application of Kepner-Tregoe methodology to the root-cause failure analysis of boiler tubes.** Jackson, C.M.; Wood, R.A.; Williams, D.N.; Payer, J.H.; Berry, W.E.; Dimmer, J.P. (Battelle Columbus Labs., OH; Electric Power Research Inst., Palo Alto, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The importance of reducing the failure rate of boiler tubes in electricity-generating units is well recognized. A significant percentage of the lost availability of operating units is a result of forced outages caused by the failure of pressurized parts of the boiler, particularly tubes. Thus, it is imperative for electric utilities to identify the cause of boiler-tube failures and to institute changes designed to prevent the occurrence of similar failures in the future. Accordingly, the Electric Power Researh Institute (EPRI) established at the Columbus Laboratories of Battelle (Battelle-Columbus) a project on the root causes of failure of boiler pressure parts. The three specific objectives of the project were as follows: (1) Perform detailed root-cause failure analyses of selected boiler pressure-part failures of medium-sized fossil-fuel-fired electricity-generating units and, to the extent possible, recommend the use or adaptation of existing knowledge to minimize the occurrence of similar failures in the future. (Waterwall-tube failures at four utilities were investigated.) (2) Based on the above analyses, recommend areas where research and development is needed in order to solve generic boiler-pressure-part problems and thereby improve the reliability of such parts. (3) Provide utilities with a good systematic problem-solving technique for arriving at the root causes of failures. The final report on this project, RP1077, has been issued (1). A paper that briefly summarizes the results of the four waterwall-tube failure analyses will be presented at the 1983 American Power Conference (2).

30621 (EPRI-CS—3272, pp 3.18-3.42) **How to identify failure modes.** Cocubinsky, J. (Foster Wheeler Corp., Livingston, NJ). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Failure may be defined as the condition which arises when a material can no longer satisfactorily perform a specified function. This condition may develop before a unit is put into operation or after the unit has been in service for a time well short of the life expectancy of the material. A failure analysis is performed to determine the mechanism or mode of failure and to establish the factors responsible for the failure. This paper is primarily concerned with the mode of failure, although causative factors may also be briefly considered.

30622 (EPRI-CS—3272, pp 3.43-3.59) **Operating guide on boiler tube failures: EPRI research project RP 1890-1.** Lamping, G.A.; Arrowood, R. (Southwest Research Inst., San Antonio, TX). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

An operating guide on boiler tube failures is currently being prepared by Southwest Research Institute for the Coal Combustion Systems Division of the Electric Power Research Institute (EPRI). The Operating Guide will contain information concerning the various boiler tube failure mechanisms that occur in fossil fuel fired steam generating boilers used for electric generation. The objectives of the project are: to generally define U.S. boiler tube failures in terms of the most common failure mechanisms; to provide information on the most probable root causes of each failure mechanism; and to identify the current preferred remedial and preventive actions. The operating guide is intended for use in the plant by electric utility boiler operators and maintenance personnel to assist them in the identification and documentation of boiler tube failures. The guide will include: recommendations for performing on-site examinations and documentation of boiler tube failures; illustrated examples of boiler tube failure mechanisms to show their distinguishing macroscopic features; information on nondestructive testing methods; and suggestions for short-term repairs.

30623 (EPRI-CS—3272, pp 3.60-3.86) **Service performance of dissimilar metal weldments in fossil-fired boilers.** Li, C.C.; Ryder, R.H. (GA Technologies, Inc., San Diego, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Failure analysis and service performance assessments were carried out on dissimilar metal welds (DMW's) between low-alloy ferritic steel and stainless steel from fossil-fired boilers. The DMW's investigated were made with both stainless steel and Inconel fillers. Service times were up to 200,000 h. All failures occurred by low-ductility cracking in the low-alloy steel immediately adjacent to the weld fusion line. Three failure modes were identified: (1) prior austenite grain boundary cracking in the low-alloy steel, one to two grains away from the fusion line, which occurred in DMW's with stainless steel fillers; (2) cracking along the weld interface, which occurred in nickel-base DMW's; and (3) oxide notch propagation, which occurred in DMW's in thin-wall tubing. Creep rupture induced by steady and cyclic loading was the predominant mechanism for cracking and failure. Inspection of boilers and analysis of the operating conditions showed that system stresses and temperature were the dominant factors influencing the performance of the DMW's. A method of calculating an incremental damage factor based on observed boiler conditions and system stress analysis results was developed and correlated with the amounts of damage observed in metallurgical examination. It was concluded that under normal base-loaded operation (538°C, 10 to 15 shutdown cycles per year), without significant system stress, neither stainless steel nor nickel-base filler DMW's should fail within their design life. Failures are believed to be a result of excessive loads or temperature.

30624 (EPRI-CS—3272, pp 3.87-3.109) **Damage in superheater tubes in supercritical boilers.** Roach, D.B.; Buchheit, R.D. (Battelle Columbus Labs., Columbus, OH). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

This paper presents the results of metallographic studies of T11 and T22 superheater-tube samples removed from coal-fired steam generators after 21 and 24 years' service in 1050 F steam. Two of the tubes had failed by the mechanism of creep rupture, four tubes were severely damaged, and the remaining 15 tubes examined exhibited relatively little damage. The conditions giving rise to the damage are described and discussed. Damage was the result of high tube temperatures, fireside corrosion from sulfur in the coal, and possibly by the action of the sootblower.

30625 (EPRI-CS—3272, pp 3.110-3.120) **Operating experience of steam generator tube failures and NDE procedures within the American Electric Power System.** Brooks, C.T.; Haas, P.E. Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The purpose of this paper is to provide a general discussion concerning the operating experience of steam generation and associated tube failures within AEP boilers. A brief description is given of problems experienced in the start up of new units or during the operation of the units following start up. Each specific area of concern briefly covers cause, location within the boiler setting, and our remedial practices. Also included are sections on: Nondestructive Examination of Boiler Tubing, Remaining Life Estimations of Boiler Components, and Recommendations and Requirements for the Future.

30626 (EPRI-CS—3272, pp 4.1-4.21) **Effects of water chemistry on waterwall tube failures.** Pavlichko, W.R. (Consumers Power Co., Jackson, MI). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

High-pressure fossil boilers in the system operate at pH levels between 9 to 11 depending on the specific water treatment employed for a unit. Many of the units are on a coordinated phosphate program while several older units are on a trisodium phosphate - sodium hydroxide program. These units have evaporators

and this type of program was intended to handle calcium, magnesium, carbonate carry-over and to minimize boiler corrosion. Two of the major types of internal boiler tube corrosion observed in the system for over 30 years have been hydrogen embrittlement and caustic gouging. Hydrogen embrittlement can develop from low pH upsets while caustic gouging can develop from high pH upsets or operating with residual hydrate alkalinity. The hydrogen embrittlement corrosion attack is still a major operating problem, regardless of water treatment. Every so often an event will occur in a fossil unit which will result in hydrogen embrittlement damage initiating in a boiler. The damage will recur in that boiler until eventual tube replacement. This problem is caused by operational triggering mechanisms and does not seem likely to go away. Caustic gouging was an extensive problem several decades ago. But now most of the units use the coordinated phosphate water treatment program. It still is a problem at three older units which have evaporators (rather than demineralizers) and use the trisodium phosphate - sodium hydroxide program. They operate with 30 to 50 ppM residual hydrate alkalinity.

30627 (EPRI-CS—3272, pp 4.22-4.40) **Creep damage and remaining life of superheater and reheater tubes: A useful approach.** Rettig, T.W.; Lefton, S.A.; Richman, R.H. (Aptech Engineering Services, Inc., Palo Alto, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

As power plants become older, the problem of creep failures in superheaters and reheaters will increase. Often, the criterion for replacement is based on the failure rate becoming intolerable. This turns out to be a very expensive retirement-for-cause and will become even more expensive as more plants approach end of life. Aptech Engineering Services, Inc., has developed a very useful and relatively quick technique for quantitative determination of thermal exposure in superheater and reheater tubes. The method provides information from which creep damage can be evaluated prior to failure and, as well, contains the basis for estimating remaining useful life. The technique also provides information to determine how much the life of a tube is decreased because of wall thinning due to the effects of erosion/corrosion mechanisms. This paper discusses the development of these procedures and how they can be used efficiently and effectively for run-repair-retire decisions rather than their being dictated by an increasing number of forced outages. If replacements are needed, the procedure will also provide information about where, how much, and with what materials.

30628 (EPRI-CS—3272, pp 4.41-4.57) **Waterwall tube wastage in the burner zone causes and cures.** Davies, R.L. (Public Service Electric and Gas Co., Newark, NJ). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Waterwall tubes at our Mercer Generating Station are experiencing extensive tube wall reduction on the fire side due to wastage. This wastage has been limited to the lower section of the burner zone and is believed to be caused by a localized reducing atmosphere, ash corrosion and flame impingement. Wall thinning in this area has been an ongoing problem at Mercer Station since the early 1960's when the steam generators were placed into operation. This paper describes the present program designed to eliminate or impede tube wastage and will discuss the probable causes and possible cures to this condition.

30629 (EPRI-CS—3272, pp 4.58-4.74) **Influence of coal quality on boiler availability due to fireside tube wastage.** Pohl, J.H.; Heap, M.P.; Mehta, A.K. (Energy and Environmental Research Corp., Irvine, CA; Electric Power Research Inst., Palo Alto, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The Electric Power Research Institute (EPRI) recognizes that coal quality can have a significant impact upon the cost of power and has instituted a long-range program to quantify this impact. This program ultimately seeks to quantitatively establish the relations between coal properties and the performance and cost of operating all major components in a power plant. This paper reports on the planning phase of the program in which available knowledge will be established and areas for future work will be identified. One aspect of the overall program, tube wastage by fireside corrosion, is discussed. The available knowledge of the causes of tube corrosion and the relationship between coal properties and corrosion are reviewed and areas for future work which may lead to better understanding of corrosion are identified.

30630 (EPRI-CS—3272, pp 4.75-4.79) **Program to measure the effects of excess air on tube wastage.** Levy, E.K.; Crim, H.G. Jr.; Wood, J.D.; Somers, B.R. (Energy Research Center, Bethlehem, PA; Potomac Electric Power Co., Alexandria, VA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The Potomac Electric Power Company and Lehigh University are jointly involved in an effort to develop a standardized means to optimize and improve boiler efficiency and to quantify the factors which physically or economically limit the approach to stoichiometric combustion and reduced exit gas temperature. Tests at reduced levels of excess air will be carried out in 1984 and 1985 at PEPCO's Morgantown plant. While these tests are in progress, it is planned to have sufficient instrumentation in place to monitor the rates of water wall tube wastage and tube corrosion in the superheater/reheater regions. A combination of ultrasonic nondestructive examination (NDE) of water wall tubes, and corrosion probes located in observation ports near the burners and in the superheater region will be used for these measurements. The tube wastage monitoring portion of the study is intended to develop a practical and economically effective approach to monitoring tube wastage for use by utilities who wish to implement their own in-house low excess air programs.

30631 (EPRI-CS—3272, pp 5.1-5.15) **Optimized Nondestructive Evaluation (NDE) methods for preventive maintenance of power boilers.** Allen, C.C.; Reinhart, E.R. (Reinhart and Associates, Inc., Austin, TX). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Plant availability is of prime concern to all industries and, thus, the trouble-free operation of power boilers is of paramount importance to the electricity generation industry. Experience has shown that a comprehensive preventive maintenance program for these boilers can greatly increase plant availability, reduce lost time by proper scheduling of work during normal plant shutdowns and increasing the safety of the plant operations. The nondestructive examination of power boilers can be a reliable, preventive maintenance tool, provided the owners commit themselves to establishing a properly engineered examination program, provide an adequate and properly scheduled time for the examination and act on the information provided by the examination. In addition, the group performing the examination must optimize the total inspection process in order to obtain the necessary data. Key elements in optimizing the inspection process are: (1) training and qualification of inspectors; (2) use of field-qualified, written procedures; and (3) use of the proper equipment. Neglect of any of the above steps can produce inspection results that are far less than desirable.

30632 (EPRI-CS—3272, pp 5.16-5.34) **Practical aspects of the field inspection of boiler tubes.** McDearman, W.R. (Combustion Engineering, Inc., Chattanooga, TN). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Nondestructive evaluation (NDE) is a very valuable tool during outages in improving availability. In fact, it can easily be

seen that the only purpose of NDE applied to a fossil unit is to improve the availability of that unit. Although useful in both scheduled and forced outages, the types of NDE and the extent to which they are applied vary according to the nature of outage. The purposes of performing NDE can be divided into two very general categories: (1) surveying - determine the extent of known damage or determine if highly suspected damage is actually present; and (2) preventative maintenance - enhance long term availability of a unit. The objective in applying NDE for either purpose is to find problems or potential problems with the least impact to operation of the plant.

30633 (EPRI-CS—3272, pp 5.35-5.45) **Computer-aided inspections of utility boilers.** Sullivan, M.F. (Aztec Engineering, Inc., Louisville, KY). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

With respect to boiler availability, predicting and preventing pressure part failure is a key part of any such availability improvement work. It naturally follows that ultrasonic thickness (UT) surveys are an effective tool to secure the required data. Since typical UT surveys generate thousands of data points, a rapid method for data analysis is required. Hence, Aztec Engineering, Inc. has developed its own computer software to meet this requirement, in a system which we refer to as CADA - computer assisted data analysis.

30634 (EPRI-CS—3272, pp 5.46-5.54) **Ultrasonic examination of boiler tubing: Automated data acquisition and computer-aided data analysis.** Lamping, G.A.; Meredith, W.R.; Lejune, L.A. (Southwest Research Inst., San Antonio, TX). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Conventional ultrasonic thickness measuring equipment and methods have been used throughout industry since the end of World War II to aid in assessing the integrity of various critical components. As energy demands have increased, the use of this technology in power generation boilers has likewise spread in an effort to prevent failure occurrence by planning for the replacement of boiler tubes and piping. During several years of experience in providing extensive boiler examination services to the pulp and paper industry, Southwest Research Inst. (SwRI) has developed some highly successful ultrasonic thickness measurement equipment and computer software. With these significant technological improvements, more rapid, accurate and repeatable boiler tubing thickness measurement examinations can be accomplished.

30635 (EPRI-CS—3272, pp 5.55-5.60) **Overview of EPRI project RP1865-1: Boiler nondestructive inspection systems.** Richman, R.H. (Aptech Engineering Services, Inc., Palo Alto, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

It may not be generally appreciated that future forced outages or curtailments could be minimized by systematic inspections during scheduled shutdowns to identify incipient failure locations. In part, this is because current nondestructive inspection (NDE) practice does not reliably detect and size boiler tube damage, and the methods suffer from low scan speeds and inadequate inspection volumes. Thus, the fraction of tubes that can be inspected in a reasonable time is quite limited. However, there is ample evidence that state-of-the-art inspection methods could often be used to detect the presence of significant defects prior to leakage, which would permit the repair of defective tubes during maintenance or planned outages. This project, consisting of four subprojects, is directed at the evaluation of available NDE techniques and the establishment of guidelines for their application to boiler tubes in utility power plants.

30636 (EPRI-CS—3272, pp 5.61-5.82) **Infrared boiler tube inspection.** Bobo, S.N.; Ryan, R.P. (Nondestructive Engineering Co., Cohasset, MA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Infrared was first used by electric utilities in 1959 when Gilbert Associates used a Barnes Engineering Co. infrared radiometer in an attempt to observe hot spots in 15 KVA transmission lines. Unfortunately the equipment had not reached a stage of development which would permit a successful inspection. Infrared did not become a useful tool for power companies until after the development of the image scanning radiometer or thermograph. Several companies built such devices which, in their early years were cumbersome and extremely fragile. But by 1970, power lines were routinely being scanned using light, portable, easily operated systems. By 1974 the use of infrared was proposed to detect thinning, and possibly other anomalies in boiler tubes. An experiment was carried out by Riley Stoker at the Jacksonville Electric Northside No. 2 boiler. Findings of that survey were inconclusive; however several sites were found in which the infrared detected anomalous conditions also confirmed by ultrasound.

30637 (EPRI-CS—3272, pp 5.83-5.102) **Ultrasonic inspection of boiler tubes.** Hyatt, R.W.; House, L.J.; Gruber, H.T. Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Improved ultrasonic testing (UT) methods for nondestructive inspection of fossil-fired boiler tubes are being sought because incremental increases in inspection reliability and speed, i.e., inspection productivity, can result in significant increases in plant availability. Documentation of the existing state of the art for UT inspection of boiler tubes and a search for such improved ultrasonic methods is a part of EPRI project RP 1865. Thus, this work-in-progress report (1) outlines the nature of the problem and the state of the technology; (2) presents findings from an investigation of potentially promising ultrasonic techniques; and (3) provides a prognosis as to applicability of such techniques in the fossil plant environment.

30638 (EPRI-CS—3272, pp 5.103-5.115) **Electromagnetic Acoustic-Wave Transducers (EMATs) for thickness gauging and defect detection in boiler tubing.** Maxfield, B.W. (MEA (Calif.), Ltd., Oakland). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Ultrasonic techniques are widely used for wall thickness measurements in metal plate and tubing. In the case of used boiler tubing, irregular external scale deposits make coupling ultrasound into the tubing very difficult and can lead to false readings due to the presence of the scale-metal interface. Invariably, one resorts to the costly, time-consuming technique of grinding off the external scale so that the true remaining metal wall thickness can be measured. Consequently, it is only practical to make a sampling of wall thickness measurements rather than to survey a large area to locate isolated defective regions. Electromagnetic acoustic-wave transducers (EMATs) provide a means of generating ultrasound directly in the metal wall to be inspected. Since only an electromagnetic field (and not a pressure wave) must be coupled from the EMAT (transducer) to the metal, no fluid couplant is required. Hence rough, scaled surfaces do not influence the coupling efficiency. If the surface is too rough (roughness comparable to the acoustic wavelength which is normally in the range of 1 to 5 mm), then the generation efficiency will be reduced.

30639 (EPRI-CS—3272, pp 6.1-6.8) **Analysis of ultrasonic testing survey.** Gembol, M.P. (Kansas City Gas and Electric Co., MO). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Kansas City Power and Light Company recently completed a boiler retubing of the La Cygne Unit I due to iron sulfide corrosion damage. This paper briefly reviews the decision to retube this boiler, with special emphasis on the role of ultrasonic survey analysis, then discusses more general applications of survey analysis and speculate on some avenues for future development.

30640 (EPRI-CS—3272, pp 6.9-6.22) **Availability improvement program for fossil-fired boilers.** Chung, L. (Cleveland Electric Illuminating Co., Ashtabula, OH). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The purpose of this paper is to present an availability improvement program, including the policy, methods, procedures, planning, preparation, etc. This program was established based on practical experience and unit characteristics in combination with available information and data accumulation. The availability of Ashtabula Plant Unit No. 5 in 1982 was 88.2%. The past six year average equivalent availability was 82.7%. It is strongly believed this improvement program helped the unit's performance.

30641 (EPRI-CS—3272, pp 6.23-6.34) **Inspection for hydrogen damage in waterwall tubes using ultrasonic techniques.** Sloat, K.A.; Jacks, A.D. (Pacific Gas and Electric Co., San Francisco, CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

This presentation summarizes the Pacific Gas and Electric Co.'s experience using ultrasonic test techniques to identify hydrogen damaged tubes in fossil fueled boilers. The use of these techniques has contributed to improving boiler availability by reducing forced outages.

30642 (EPRI-CS—3272, pp 6.35-6.52) **Mitigating forced outages by selective replacement of boiler tubes.** Loper, M.J.; Shoemaker, R.D.; Stromp, J.G. (San Diego Gas and Electric Co., CA). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Metallurgical analysis, nondestructive examination, and effective tube replacement criteria can be a logical and cost effective tool to mitigate forced outages in boilers. This paper outlines San Diego Gas and Electric Co.'s efforts to eliminate boiler tube failures by providing a systematic approach to boiler maintenance while reducing forced outage rates and identifying failure mechanisms in time to initiate corrective action prior to scheduled outages. The boiler tube problems in one unit, South Bay Unit 3, are examined in this report. This method of inspection and repair is conducted on each of the problem boilers in the system.

30643 (EPRI-CS—3272, pp 6.53-6.61) **Centerwall deposition patterns in a large supercritical steam generator.** Herre, B.H.; Huff, F.P. III. (Pennsylvania Power and Light Co., Allentown). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

The subject units are located at Pennsylvania Power and Light Company's Brunner Island and Montour Steam Electric Station. They are pulverized coal, tangentially-fired steam generators with divided furnaces. All the units are rated at 5,700,000 lb/hr, 3830 psig, and 1010°F at the superheater outlet. Water flow is in series through the centerwalls and the waterwalls, bottom to top. All of the units are on all volatile treatment, utilizing ammonia and hydrazine. All three units have had an excellent operating history since coming on line between 1969 and 1972. Tube samples are collected once per year from each of the units to determine the need for chemical cleaning. Corrosion product deposits are removed by hand scraping. The results are used in conjunction with operating history and length of time since last cleaning to make a judgement on the need for cleaning of the division wall or the entire unit. Experience indicates that, for units of this type, corrosion products accumulate at a rate about 10 times higher in the centerwall than in the waterwalls, and that the centerwall is more tolerant of high deposit amounts than the waterwalls.

30644 (EPRI-CS—3272, pp 7.16-7.24) **Babcock and Wilcox integrated water chemistry monitoring and control system.** Schmotzer, J.K. (Alliance Research Center, OH). Dec 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920104. (CONF-8304157—).

From Failures and inspections of fossil-fired boiler tubes conference; Bal Harbour, FL, USA (13 Apr 1983).

Feedwater and steam purity are now among the most important considerations for ensuring the availability and reliability of components in utility power generation systems. Localized corrosion damage in boilers and steam turbines has led to expensive and sometimes lengthy forced outages. Turbine blade or rotor cracking and boiler tubing corrosion are the specific problems. Research programs sponsored by EPRI and General Electric have identified inadequate feedwater and steam purity control as major sources of these problems.

30645 (EPRI-EL—3359-Vol.1) **Improvement in accuracy of prediction of electrical machine constants and generator models for subsynchronous resonance conditions. Volume 1. Three-dimensional electromagnetic field analysis of electrical machinery. Final report.** Chari, M.V.K.; Minnich, S.H.; Schulz, R.P. (General Electric Co., Schenectady, NY (USA). Corporate Research and Development Dept.). Apr 1984. 259p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920310.

Volume 1 of this report describes the development of three-dimensional vector potential finite element techniques for the calculation of 3-D magnetic fields in turbine-generators and other devices. Both nonlinear magnetostatic and linear eddy current versions were successfully formulated and verified against known analytical solutions or simple tests. The magnetostatic version was demonstrated on turbine-generator geometry.

30646 (EPRI-EL—3359-Vol.2) **Improvement in accuracy of prediction of electrical machine constants and generator models for subsynchronous resonance conditions. Volume 2. Application of two-dimensional finite-element techniques for synchronous machine modeling. Final report.** Chari, M.V.K.; Minnich, S.H.; Schulz, R.P. (General Electric Co., Schenectady, NY (USA). Corporate Research and Development Dept.). Apr 1984. 341p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920311.

Volume 1 of this report describes the development of three-dimensional vector potential finite element techniques for the calculation of 3-D magnetic fields in turbine-generators and other devices. Both nonlinear magnetostatic and linear eddy current versions were successfully formulated and verified against known analytical solutions or simple tests. The magnetostatic version was demonstrated on turbine-generator geometry. Volume 2 describes the application of 2-D finite element techniques for the calculation of generator equivalent circuit models for system simulation studies. Results of the calculation of operational inductances are validated by test. This successful validation suggests that the methods developed are capable of producing significantly better generator simulation models than those now in use. A further advantage is that the method uses direct analysis of the generator design (without the need for empirical correction), allowing prediction of generator characteristics during the design process.

30647 (EPRI-NP—3402-SR, pp 11.1-11.18) **Sampling of corrosion products in Baltimore Gas and Electric Company fossil stations.** Kaupa, A.J. (Baltimore Gas & Electric Co., MD). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

The objectives of this paper are to describe corrosion product sampling practices and the significance of corrosion product sampling in BG & E fossil stations.

30648 **(EPRI-NP—3487) Role of chemical additives in transporting and depositing corrosive impurities in steam. Final report.** Allmon, W.E.; Berthold, J.W.; Mravich, N.J. (Babcock and Wilcox Co., Alliance, OH (USA). Research and Development Div.). May 1984. 111p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920397.

Recent tests conducted under RP-1068 demonstrated that ammonia, hydrazine, and other commonly used chemical additives can alter the transport and deposition of corrosive solutions of chloride and sulfate. Chemical systems of ammonium-chloride-water, ammonium-sulfate-water, and hydrazonium-sulfate-water were studied and found to be significantly more soluble in steam than the sodium compounds. Thus, deposition in the dry region of the low-pressure turbine may be minimized by the presence of aqueous ammonia and hydrazine. However, the data also indicated that acidic decomposition products from those chemicals may be responsible for a highly corrosive, low-pH mist in the wet-dry region of the low-pressure turbine. Data is needed on the chemical reaction rates to determine if sufficient time is available for those reactions to occur. Sputter-tube tests, vapor pressure tests, and high-temperature laser-induced spectroscopy were used to study those chemical systems and are described in this report.

30649 **(LA-UR—84-348) Commissioning tests of the Bonneville Power Administration 30 MJ superconducting magnetic energy storage unit.** Boenig, H.J.; Hauer, J.F. (Los Alamos National Lab., NM (USA); Bonneville Power Administration, Portland, OR (USA)). 1984. Contract W-7405-ENG-36. 9p. (CONF-840706—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84006033.

From Power Engineering Society summer meeting; Seattle, WA, USA (15 Jul 1984).

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A 30 MJ (8.4 kWh) Superconducting Magnetic Energy Storage (SMES) unit with a 10 MW converter has been installed and commissioned at the Bonneville Power Administration (BPA) substation in Tacoma, Washington. This is the first large-scale application in the US of superconductivity in an electric utility system.The unit, which is capable of absorbing and releasing up to 10 MJ of energy at a frequency of 0.35 Hz, was designed to damp the dominant power swing mode of the Pacific AC Intertie. This paper describes the electrical characteristics of the magnetic energy storage unit, its modes of operation, results of device tests, means for controlling real and reactive power, and some initial power system response tests. A short summary of the operating history of the unit over the first eleven months is also presented.

30650 **(TVA/PUB—84/45) Coal-fired plants project retirement plan. Supplement.** (Tennessee Valley Authority, Chattanooga (USA). Office of Power). May 1984. 148p. NTIS, PC A07/MF A01. Order Number DE84901365.

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2002 Environmental Aspects

REFER ALSO TO CITATION(S) 30170, 30171, 30175, 31671

30651 **(DOE/PC/60271—1) Modelling and assessment of advanced processes for integrated environmental control of coal-fired power plants. Technical progress report.** Rubin, E.S.; Barrett, J.G.; Bloyd, C.N.; McMichael, F.C. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Center for Energy and Environmental Studies). Jan 1984. Contract FG22-83PC60271. 16p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006425.

Objectives and tasks for the development of an integrated environmental control assessment model incorporating advanced processes for air pollution control at new coal-fired electric power plants are reviewed. Analytical models for conventional technologies have been combined into a prototype systems model of a power plant incorporating several pre-combustion and post-combustion processes. Several advanced processes have been tentatively identified for later modelling efforts. During the next project period emphasis will be on the incorporation of advanced modelling techniques to facilitate the analysis of uncertainty. Mathematical optimization techniques also will be investigated for applicability to this project. 23 refernces, 2 tables.

30652 **(DOE/PC/60271—T1) Modelling and assessment of advanced processes for integrated environmental control of coal-fired power plants. Technical progress report.** Rubin, E.S.; Barrett, J.G.; Bloyd, C.N. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Center for Energy and Environmental Studies). Apr 1984. Contract FG22-83PC60271. 43p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011555.

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Efforts during this quarter focused on two principal activities: (1) consolidating existing models of power plant environmental control options into a computer program able to analyze power plant performance and control technology costs for a conventional plant using specified combinations of frontend (coal cleaning) and backend (flue gas treatment) processes; and (2) exploring new software approaches for power plant optimization and the analysis of uncertainty model components. Existing models of power plant performance and control technologies costs have been formally connected to a recently developed model of conventional coal cleaning plants, which are described in detail. The construction of an analytical model simulating the operation of four generic levels of coal preparation plant is described. The operational details of the plant being modeled are adjusted so that the overall process yield is maximized. The concept of washability data is provided and methods for manipulating this data, particularly to allow for the effects of washing equipment inefficiency, are described. The application of Lagrange multiplier theory to the problem of process yield maximization is discussed. The coal assumptions used in estimating the price of cleaned coal are described. Finally, use of the model is illustrated. Research was also initiated on two new software approaches for facilitating assessments of integrated environmental controls for conventional and advanced power plant designs. One approach involved an investigation of formal optimization techniques using mixed integer linear programming (MILP). A second effort, complimenting the first, involved the implementation of existing performance cost models for flue gas treatment systems in a newly developed software system called DEMOS (for Decision Modelling System). 13 references, 11 figures, 6 tables.

30653 **(EPRI-CS—3257) Proceedings: second conference on fabric filter technology for coal-fired power plants.** (Acurex Corp., Mountain View, CA (USA)). Nov 1983. 760p. (CONF-8303125—). Electric Power Research Institute, 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091.

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

Separate abstracts were prepared for papers presented in the following areas: (1) Background; (2) Manufacture and Utilization of Fabric Bags; (3) SO_2 Removal in Conjunction with Fabric Filters; (4) Advanced Concepts in Fabric Filtration; (5) Pilot-Scale Baghouse Evaluation; and (6) Full-Scale Plant Evaluations.

30654 (EPRI-CS—3257, pp 1.1-1.36) **1983 update, operating history and current status of fabric filters in the utility industry.** Piulle, W.; Carr, R.; Goldbrunner, P. (Electric Power Research Inst., Palo Alto, CA; Burns and Roe, Inc., Oradel, NJ). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

This report presents a summary of baghouse installations currently operating, or in the design/construction phase, for coal-fired utility boilers. Design data presented include: baghouse features, coal analysis, bag material, ash removal system, pressure drop

and collection efficiency. Historical data on the operation and maintenance of units in service is also included. Results show that as of August 1982, 116 fabric filters were in operation or in design and construction on utility boilers totaling 20921 MW of generating capacity. Baghouse sizes range from 6 MW to 820 MW. The largest utility baghouse installation controls particulate emissions from two 800 MW units at the Four Corners station of Arizona Public Service. The majority of units operate satisfactorily, meet performance guarantees and produce almost invisible (3-5%) stack opacities.

30655 (EPRI-CS—3257, pp 2.1-2.23) **Economics of fabric filters and electrostatic precipitators, 1983.** Mora, R.R.; Scheck, R.W.; Carr, R.C. (Stearns-Roger Engineering Corp., Denver, CO; Electric Power Research Inst., Palo Alto, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

This paper presents the comparative economics of electrostatic precipitators (ESP) and fabric filters, including the cost effects of ESP gas conditioning, shake-and-deflate cleaning, improved plenum designs, and sonic horns with reverse gas, and the relative advantages of using these particulate collection devices downstream of a spray dryer flue gas desulfurization system. The results also show the economic advantages of designing the FF to higher air-to-cloth ratios. This paper is the summary and conclusions of the study conducted for Electric Power Research Institute under contract RP1129-9 titled Economics of Fabric Filters and Electrostatic Precipitators, 1983.

30656 (EPRI-CS—3257, pp 3.1-3.12) **Manufacture of glass-fiber yarns.** Bolen, G.N. (Owens-Corning Fiberglas Corp., Toledo, OH). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

A glass fiber, like all glass, is perceived more as a state of matter than a particular substance. The glass-like or vitreous state is that of a solid with the molecular structure of a liquid. Today, glass is the fiber of choice in many fabric filters, particularly those used by industries and utilities that generate electric power using low-sulfur coals. Glass-fiber fabrics can withstand continuous flue gas temperatures of 500°F and maintain good resistance to acids. Glass-fiber yarns that compose filtration fabrics are specified by a nomenclature system identifying yarn properties, diameter, thickness, and even the direction the yarn is twisted. Yarns are chosen by the weaver to form fabrics that provide characteristics necessary to perform in the baghouse environment.

30657 (EPRI-CS—3257, pp 4.1-4.24) **Fabric and finish selection, manufacturing techniques and other factors affecting bag life in the coal fired boiler application.** Hotchkiss, C.B.; Cox, L.F. (Menardi-Southern Corp., Torrance, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

Filter bags are a relatively small part of the cost of the fabric dust collector. However, they are one of the critical factors which govern the economic and operating success of the unit. When designing a filter bag for a particular application, a great number of variables must be considered. This paper will cover three broad areas which are considered of primary importance. First is the fabric selection itself. The proper selection of fabric includes consideration of such variables as yarn construction, weave, weight, count, permeability and other important factors. The paper will highlight the most important variables, clarify terminology and discuss factors which influence product selection. The second important variable which must be considered is the finish that is put on the various fabrics. There are in use today, three major groups of finishes with many variations in each. These are the Teflon based finishes, those described as acid resistant finishes and the more common tri-component finishes. This paper will discuss the function, composition, application and use of these various finishes. Finally, the other major factor which must be considered is the actual physical parameters and the fabrication of the filter bag itself. This paper will highlight those areas which are not normally considered by the end user when purchasing or in developing a specification for a high temperature fiber glass filter bag.

30658 (EPRI-CS—3257, pp 5.1-5.14) **Filter bag construction design considerations for optimized performance.** Grubb, W.T.; Reisinger, A.A. (Wheelabrator-Frye Inc., Pittsburgh, PA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

To provide the optimum in fabric filter operation it is necessary to design and construct the fabric, bags and integral accessories with consideration of their function. The optimum fabric selection and quality control measures required in filtration fabrics cannot be fully utilized without established techniques being adhered to during the design and construction of the bags. The specific bags addressed in this paper are those predominant in the utility industry where reverse air or combination cleaning methods are used.

30659 (EPRI-CS—3257, pp 6.1-6.23) **Fabric evaluation program at Coyote Unit No. 1 operating results update.** Reisinger, A.A.; Grubb, W.T. (Wheelabrator-Frye Inc., Pittsburgh, PA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

The fabric filter at Coyote Unit No. 1 has been in service since May 1981 collecting lignite fly ash and sodium-based spray dryer product as the second stage of the dry scrubbing system installed by the Wheelabrator-Frye Inc./Rockwell International Joint Venture. This paper highlights the results of a program conducted from the start of unit operation to evaluate the performance of various filtration fabrics in full compartment trials. The unit uses predominantly acrylic fabric and operates at filter ratios of typically 3:1 using combination deflation air and mechanical shaking as the fabric cleaning method. Comparison of the pressure drop, throughput, replacement history, filtration parameters, and changes in physical properties of the various fabrics to date are reviewed.

30660 (EPRI-CS—3257, pp 7.1-7.19) **Processing and end-use performance of finished glass fabrics for filtration.** Westley, M.W.; Lau, K.W. (E.I. du Pont de Nemours & Co., Inc., Wilmington, DE). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

Glass filaments in woven glass fabrics must be protected from self-abrasion to avoid premature loss of strength. The lubricants which are used to protect glass yarns during forming and weaving are not thermally stable at coal fired boiler baghouse temperatures. One of the important factors in successful longterm baghouse operation is the selection and proper application of a high temperature lubricant to protect the glass yarns during cleaning cycle flexing. TEFLON B finish was used in the first utility baghouse in 1973, and it is still the most widely used finish in this industry. This paper describes fabric finish processing methods and types of fabric weaves currently in use. Quality control and testing factors are described. The relationship between laboratory tests and field performance is discussed.

30661 (EPRI-CS—3257, pp 8.1-8.11) **Filter fabric concepts in Europe for coal-fired boiler applications.** Bergmann, L. (Filter Media Consulting, Inc., LaGrange, GA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

A listing of 20 European utility and industrial installations of baghouses on coal-fired boilers reveal information of higher air-to-cloth ratios, as compared to the US, and the usage of needled felts from several different fibers. Filter media, as needled felts, are more sophisticated in Europe; utilizing progressive density fiber layer, sometimes from 2 or 3 different fiber deniers (fiber fineness). Specially treated Nomex/sup R/, Teflon/sup R/, 2nd generation needled glass and Dralon T/sup R/ felts are being discussed. The utility industry is invited to benefit from European experience.

30662 (EPRI-CS—3257, pp 9.1-9.32) **22 MW coal-fired demonstration of dry SO_2 scrubbing with sodium sorbent compounds.** Muzio, L.J.; Sonnichsen, T.W.; Green, G.P.; Brines, H.G.; Hooper, R.G. (KVB, Inc., Irvine, CA; Public Service Co. of Colorado, Denver; Electric Power Research Inst., Palo Alto, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

A full-scale demonstration of SO_2 removal by the injection of dry sodium sorbents upstream of a fabric filter baghouse was conducted at Public Service Company of Colorado's Cameo Unit 1. Five sodium compounds were tested: nahcolite, naturally occurring trona from Wyoming and California, a commercially produced sodium sesquicarbonate and soda ash. The program demonstrated the capability of 70 percent SO_2 removal with the injection of nahcolite and the trona materials without detrimental impacts on baghouse operation or performance. SO_2 removals were shown to be primarily a function of the type and quantity injection. The performance of all three trona materials was below that of nahcolite. Significant reductions in the rate of reaction between nahcolite and SO_2 were observed at flue gas temperatures at the baghouse inlet below 275°F. The reaction rate between SO_2 and trona was not affected by reduced baghouse temperatures. Soda ash was ineffective as a scrubbing agent even at high injection rates with a maximum SO_2 removal of 15 percent. The dry injection of nahcolite and trona also resulted in a simultaneous removal of nitric oxide on the order of 10 percent.

30663 (EPRI-CS—3257, pp 10.1-10.29) **Economics of dry Flue Gas Desulfurization (FGD) by sorbent injection.** Naulty, D.J.; Scheck, R.W.; McDowell, D.A.; Hooper, R. (Stearns-Roger Engineering Corp., Denver, CO; Electric Power Research Inst., Palo Alto, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

Preliminary designs were developed for dry sorbent injection into duct work upstream of a fabric filter. Uncertainties in material handling, pulverization, and waste disposal were investigated in detail and designs were produced as a basis for cost estimating. Dry sorbent injection of trona and nahcolite was evaluated relative to the more conventional spray dryer flue gas desulfurization (FGD) system for a 0.5 percent sulfur coal application. Capital costs of the trona and nahcolite dry injection systems were about $25/kW, compared to $115/kW for spray drying. On a levelized cost basis, trona injection was least expensive, followed by nahcolite injection and spray drying. However, these economics were found to be highly sensitive to the delivered price of the sorbent, sulfur content of the coal, and the removal required. Cost for waste disposal and the size of generating plant were found to be important but less significant. The technical portion of the evaluation indicates dry sorbent injection has advantages in operation, maintenance, simplicity, utility use, pressure drop, and shorter construction time. Disadvantages include a larger and more elaborate disposal area design. Additional disadvantages for nahcolite include reagent availability and temperature sensitivity.

30664 (EPRI-CS—3257, pp 11.1-11.41) **EPRI spray dryer/baghouse pilot plant status and results.** Rhudy, R.G.; Blythe, G.M. (Electric Power Research Inst., Palo Alto, CA; Radian Corp., Austin, TX). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

In February 1982, the Electric Power Research Institute (EPRI) initiated a 2-1/2 MW spray dryer/baghouse flue gas desulfurization (FGD) pilot plant program at their Arapahoe test facility. The objective of the pilot plant program is to confirm the capabilities of the FGD process and to provide the electric utility industry with reliable design and operating information for spray dryer/baghouse FGD systems. Spray dryer operability has been found to be improved by wider approach to adiabatic saturation and by operating in the recycle rather than once-through mode. No fabric filter operability problems of any significance have been observed, regardless of operating conditions. Pressure drop data show that at similar air-to-cloth ratios, the range of fabric filter pressure drop downstream of the spray dryer is similar to that of other compartments, even though higher mass loadings are encountered downstream of the spray dryer. The SO_2 removal results have shown that removal in the spray dryer is enhanced by closer approach to adiabatic saturation at the dryer outlet and by operating in the recycle rather than once-through mode.

30665 (EPRI-CS—3257, pp 12.1) **Review of EPA fabric filtration research and development.** Hovis, L.S. (Environmental Protection Agency, Research Triangle Park, NC). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

Current research and development on fabric filtration at EPA is summarized by describing the status of several projects supported by the Agency. Projects include fabric filtration modeling, evaluation of high velocity pulse-jet fabrics, and full-scale baghouse monitoring. Recent R & D effort has emphasized electrostatic enhancement of fabric filtration (ESFF). The results of this effort are reviewed as in-house and pilot plant comparisons of ESFF and conventional fabric filtration, both pulse-jet and reverse-air. The latest ESFF studies have involved the verification of a nonuniform deposition mechanism to explain reduced resistance to flow and the preparation of a fabric-electrode system suitable for full scale reverse air applications. Results of these studies are presented along with a preview of the schedule for testing ESFF on full size utility bags.

30666 (EPRI-CS—3257, pp 13.1-13.14) **Influence of cleaning conditions on outlet dust concentration of a pulse jet fabric filter.** Klingel, R.; Loeffler, F. (Univ. of Karlsruhe, Germany). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

The high collection efficiency of fine particles with a fabric filter must be attributed to a supplementary filter layer - a dust deposit in the filter medium, and the dust layer forming on it. The larger dust particles widely act as a separator of a multitude of smaller particles. With the accumulation of this porous dust cake, collection is improved but, at the same time, the pressure drop is increased whereas the gas flow rate is reduced. For this reason it is necessary to clean the bag. After the cleaning process there is a distinct jump in pressure drop, though because of a residual dust deposition, pressure will not return to its initial value. The cleaning process is accompanied by a short-time increase of the clean gas dust concentration, particularly when the filter bag is cleaned by pressure pulses. These processes recur cyclically. At the same time, the bags should be cleaned so that, with the lowest possible clean gas dust concentration a stable state of filtration sets in with a constant pressure drop. This is a rather difficult optimization task. In this report the results of studies on particle collection measurements are presented, results obtained by using a filter bag of field-proven dimensions cleaned by pressure pulses. During these studies the time behaviour of the clean gas dust concentration, related to the cleaning intensity, was of special interest.

30667 (EPRI-CS—3257, pp 14.1-14.30) **Fluid dynamic guidelines for fabric filter design.** Afonso, R.F.; Eskinazi, D. (Dynatech R/D Co., Cambridge, MA; Electric Power Research Inst., Palo Alto, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

In recent years, the utility industry has turned to fabric filters as an alternative technology to electrostatic precipitators for particulate emission control from pulverized coal-fired power plants. One of the significant issues in optimizing this technology is minimizing pressure drop. The objective of this project is to perform an experimental modeling program to develop design guidelines for optimizing the fluid dynamic performance of baghouses. A matrix of geometric configurations and operating conditions was experimentally investigated to establish the characteristics of optimum component and system designs. An economic evaluation of recommended geometrical modifications was performed. Results of the entire program have been integrated into fluid dynamic design guidelines for utility fabric filter systems. It is evident from the results presented that the fluid dynamic design of fabric filter systems can be improved significantly.

30668 (EPRI-CS—3257, pp 15.1-15.22) **Fabric filtration in Japan.** Iinoya, Koichi. (Society of Powder Technology, Kyoto, Japan). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

The presentation includes the following topics on fabric filters in Japan: (1) Japanese Industrial Standard JIS R 3421 Finished Glass Cloths for Bag Filters; (2) Tentative Industrial Standard Filter Fabrics for Dust Collectors proposed by the Association in Japan 1983; (3) Experimental Grade Efficiency of a Fabric Filter for a Coal Fired Furnace; (4) List of the Titles of Original Research Papers of Fabric Filters, published by the Iinoya Laboratory at both Nagoya University and Kyoto University; and (5) Comparison of Dust Cleaning Performances of Collapse and Mechanical Shaking Types of Fabric Filters.

30669 (EPRI-CS—3257, pp 16.1-16.31) **High ratio fabric filter operating experience on utility coal fired boilers.** Lanois, G.D.; Wiktorsson, A. (Flakt, Inc., Knoxville, TN; Flakt Industri AB, Vaxjo, Sweden). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

Over the past several years high ratio fabric filters have been installed, and shown successful operating experience for particulate and flue gas desulfurization (FGD) control on industrial and utility coal fired boilers up to 150 MW in size. The successful experience demonstrated on a range of boiler and fuel application indicates that high ratio fabric filter technology is a cost effective and viable alternative. The rationale for selection of high ratio technology over low ratio or electrostatic precipitators is at significant savings in capital cost and space consumption. Currently there are at least ten advanced design high ratio fabric filters operational on utility coal fired boilers and approximately 30 additional to be commissioned through 1984. Specific start-up, operational, maintenance, and performance experience of operating units is detailed.

30670 (EPRI-CS—3257, pp 17.1-17.24) **Performance evaluation of reverse-gas baghouses on coal-fired utility boilers.** Carr, R.C.; Smith, W.B.; Cushing, K.M. (Electric Power Research Inst., Palo Alto, CA; Southern Research Inst., Birmingham, AL). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

The Electric Power Research Institute (EPRI) is currently supporting an extensive research program to optimize the design, operation, and reliability of baghouse technology for the electric utility industry. Pilot and full-scale evaluations are being performed to measure, interpret and predict baghouse performance. Results show that baghouses routinely achieve a clear stack and particulate matter collection efficiencies well in excess of 99.9%. Data are also reported which suggest a quantitative relationship between tubesheet pressure drop and air-to-cloth ratio for reverse-gas cleaned baghouses. Large residual dust cakes of up to 1.3 lb/ft^2 (650 mg/cm^2) or 130 lb/bag were measured in the bags after cleaning by reverse-gas. Although the performance of the first-generation utility reverse-gas baghouses has been quite good, it appears that significant reductions in pressure drop and collector capital cost are possible by more effective bag cleaning. Applying intense sonic energy (horns) during reverse-gas cleaning is a recent development which achieves significantly improved dust cake removal. Tests now underway suggest that this hybrid bag cleaning mode can reduce the operating pressure drop by more than 50% and further establish baghouses as a very competitive option for high efficiency particulate control.

30671 (EPRI-CS—3257, pp 18.1-18.27) **Study of sonic cleaning for enhanced baghouse performance.** Cushing, K.M.; Pontius, D.H.; Carr, R.C. (Southern Research Inst., Birmingham, AL; Electric Power Research Inst., Palo Alto, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

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Fabric filters (baghouses) are rapidly gaining acceptance as particulate control devices for the electric utility industry because of their high efficiency and relative insensitivity to coal composition. As a result of their increasing application, means are being investigated to optimize their performance in terms of cost and maintenance. One promising method of effectively removing or avoiding heavy residual dust cakes which can cause excessive pressure drop and bag failures is the application of sonic energy. This paper discusses the first phase of a program to evaluate sonic cleaning of bags. Six commercial sonic generators have been tested to measure the effects of different amplitudes and frequencies. These devices include frequencies of 150, 200, 250, 360, and 550 Hz. Results from tests at EPRI's 10 MW pilot plant and a full-scale baghouse are discussed. Future plans include testing a wider range of frequencies using a special sound source with adjustable frequency and amplitude.

30672 (EPRI-CS—3257, pp 19.1-19.30) **Analysis and interpretation of fabric filter performance.** Smith, W.B.; Felix, L.G.; Steele, W.J. (Southern Research Inst., Birmingham, AL). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

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The collection efficiency and pressure drop in fabric filters are not determined by the fabric, but by the nature of the residual dust cake. Experimental procedures have been developed to characterize the physical, chemical, and electrical properties of fly ashes in order to investigate the mechanisms of cake formation and adhesion. Results are discussed from studies performed in EPRI's 10 MW Fabric Filter Pilot Plant (FFPP) at the Arapahoe Test Facility and several full-scale utility baghouses.

30673 (EPRI-CS—3257, pp 20.1-20.23) **Operation and maintenance experience on the EPRI 10 MW high sulfur coal pilot baghouse at Plant Scholz.** Gehri, R.P.; Piulle, W. (Southern Co. Services, Inc., Birmingham, AL; Electric Power Research Inst., Palo Alto, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

This report discusses the operation and maintenance experience on the Electric Power Research Institute 10 MW High Sulfur Coal Pilot Baghouse at Gulf Power Company's Plant Scholz. The Southern Company is acting as cofunder and host utility for the project and Southern Company Services, Inc. is the operation and maintenance contractor for EPRI. A brief description of the

project objectives and baghouse design is given. The major emphasis, however, is placed on the baghouse startup, operation and maintenance history for the first seven months. Problems encountered and modifications made to the site are also discussed.

30674 (EPRI-CS—3257, pp 21.1-21.20) **Performance of a 10 MW baghouse collecting fly ash from a high-sulfur coal-fired boiler.** Wilson, R.R.; Smith, W.B. (Southern Research Inst., Birmingham, AL). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

A 10 MW, five-compartment, pilot-scale fabric filter has been built and operated to evaluate the performance of baghouses collecting fly ash from power plants burning high-sulfur coal. The results of a cold start-up procedure and initial operation at a 1.6:1 air/cloth ratio and reverse-gas cleaning are described. Evaluations of several parameters relating to the aerosol and the baghouse at both high and low load conditions are presented. Measurements of gas composition, ash concentration and size distribution, acid dewpoint, bag fabric strength and permeability, temperature variations, baghouse efficiency, and outlet opacity are included. The average baghouse pressure differential is about four inches w.c. flange-to-flange after six months of operation. Although the system has undergone several shutdown/startup sequences, all without preheating or precoating, the system continues to operate at a relatively low pressure drop with no deleterious effects attributable to dewpoint excursions or high SO/sub x/ concentration. Dust cakes on the bags, however, are relatively heavy-up to 80 lbs/bag. Future tests will include operation in different cleaning modes, higher air/cloth ratio, and possibly burning a different coal.

30675 (EPRI-CS—3257, pp 22.1-22.21) **Japanese technical development of bag houses for coal fired utility boilers.** Nakabayashi, Y.; Mouri, K.; Itou, T. (Electric Power Development Co., Ltd., Tokyo, Japan). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

The first fly ash bag house pilot test using actual flue gas in Japan for the leaked-NH_3-contained flue gas from Selective Catalytic Reduction (SCR) was carried out under the joint development program between Electric Power Development Co., Ltd., Sumitomo Heavy Industries, Ltd., and Ishikawajima-Harima Heavy Industries Co., Ltd. After 33 months pilot operation at a capacity of 2000 Nm^3/H (1244 SCFM), bag life longer than 2 years was confirmed even for the flu gas containing NH_3 and SO_3 from the SCR, which is necessary equipment in several coal fired utility boilers in Japan. Excellent performance was also confirmed through the test period, and sub-micron particle and trace elements collection efficiency were also measured. The paper also presents a brief discussion on the bag house downstream of flue gas desulfurization.

30676 (EPRI-CS—3257, pp 23.1-23.32) **Performance evaluation of several full-scale utility baghouses.** Felix, L.G.; Merritt, R.L.; Carr, R.C. (Southern Research Inst., Birmingham, AL; Electric Power Research Inst., Palo Alto, CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

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As part of an extensive fabric filter study for the EPRI the performance of full scale utility fabric filters is being studied. To date, nine utility fabric filters associated with boilers fueled with four distinct coal types have been visited. At two of these fabric filters the EPRI Fabric Filter Sampling System has been used for long- and short-term testing of filtration fabrics. During each site visit and inspection, boiler and baghouse operating data are gathered and bag, dust cake, coal and hopper ash samples are obtained. As part of an effort to relate fabric filter performance to the physical and chemical properties of the fly ash and bag fabric, these samples are subjected to extensive analysis. Summaries of some of the more interesting results obtained at these installations are reviewed and compared with the performance of the EPRI pilot scale baghouse at the Arapahoe Test Facility. Results from the Fabric Filter Sampling System fabric screening studies are discussed.

30677 (EPRI-CS—3257, pp 24.1-24.45) **Operating experience in Australia with fabric filters on power boilers.** Walker, F.H.; Floyd, G.J. (Electricity Commission of New South Wales, Australia). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

The paper discusses the current operating experience with fabric filters on power boilers operated by The Electricity Commission of New South Wales. It describes the procedures adopted in the start-up of the new 660 MW units at Eraring Power Station, the initial problems encountered, the continuing problems which still give concern and concludes with program of action to improve the performance of the fabric filters. The paper also contains details of pulse cleaned fabric filters recently retrofitted to older boiler units operated by The Electricity Commission of New South Wales and others retrofitted to existing power station boilers by the Queensland Electricity Generating Board.

30678 (EPRI-CS—3257, pp 25.1-25.34) **Present status of bag filters at Pennsylvania Power & Light Company.** Wagner, N.H. (Pennsylvania Power & Light Co., Allentown). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

This paper will briefly review the design parameters of the bag filters at Pennsylvania Power and Light's Sunbury, Holtwood and Brunner Island Steam Electric Stations. It will highlight the more interesting operating and maintenance problems to date. Considerable time will be spent in discussing various improvements being looked at for each location in order to reduce pressure drop and/or increase bag life. Improvements include sonic horn installation and evaluation as well as evaluation of filter drag for various fabric/finish combinations.

30679 (EPRI-CS—3257, pp 26.1-26.44) **Use of sonic air horns as an assist to reverse air cleaning of a fabric filter dust collector.** Menard, A.R.; Richards, R.M. (Public Service Co. of Colorado, Denver). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

A detailed summary of the installation, test program, and performance of sonic air horns used as an assist to reverse air cleaning of an operating fabric filter dust collector (FFDC) is presented. Four sonic air horns were installed and tested on compartment number 11 of Public Service Company of Colorado's Arapahoe Unit No. 3 FFDC. The overall objective of the test program was to reduce the pressure drop across the tube sheet of the test compartment. Sonic cleaning reduced the compartment tube sheet differential pressure by approximately 27 percent; this was sufficient to warrant the purchase and installation of two (2) sonic air horns in each of the 14 baghouse compartments.

30680 (EPRI-CS—3257, pp 27.1-27.27) **Fluid dynamic considerations in the design of a fabric filter system.** Clay, J.P. (Lawrence Livermore National Lab., CA). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

The typical fabric filter owner buys the least expensive air pollution equipment in order to maximize company profits. Least expensive is generally interpreted to mean lowest purchase price. One should also realize that the cost of operating the equipment will exceed the purchase price and cost of borrowing money for equipment used 20 years or more. A few dollars saved in cheap design may well cost ten times the money saved in operating costs.

Examples are given of various design concepts and dollar impacts. It is strongly recommended that equipment buyers require efficient areodynamic designs and thorough model studies to guarantee well behaved air flow.

30681 (EPRI-CS—3257, pp 28.1-28.18) **Baghouse design and operating considerations at North Valmy Unit One.** Warburton, A.W. (Sierra Pacific Power Co., Reno, NV). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

This paper describes the baghouse design and operating experience at Sierra Pacific Power Company's North Valmy Unit 1. Baghouse operation began in November 1981. The Carborundum/Flakt baghouse contains 6480 bags in ten compartments. The unit has not limited boiler operation to date. Plant operating procedures have contributed to a bag failure rate of less than 0.25%, substantially better than the 5% attrition allowance permitted in the purchase contract. Unit start-up and operation procedures are reviewed, in concert with a discussion of baghouse bypass control modifications which have minimized the effects of boiler transients.

30682 (EPRI-CS—3257, pp 29.1-29.27) **Fabric filter research at Southwestern Public Service Company.** Chambers, R. (Southwestern Public Service Co., Amarillo, TX). Nov 1983. Electric Power Research Inst., 3412 Hillview Ave., Palo Alto, CA 94304. Order Number TI84920091. (CONF-8303125—).

From 2. conference on fabirc filter technology for coal-fired power plants; Denver, CO, USA (22 Mar 1983).

This paper describes activities during the fourth year of a fabric filtration study at Harrington Station. In addition, a pilot baghouse study, also being conducted at Harrington, is discussed. Comparisons are made between shake/deflate and reverse air fabric filters. Areas of testing in the pilot baghouse include scale-up studies with shake/deflate cleaning, reverse air fabric studies, and special interest studies.

30683 **(EPRI-EA—3484) Environmental impacts of dispersed and concentrated siting of coal-fired power plants. Final report.** Rowland, R.H.; Gould, K.E.; McDonald, E. (Kaman Tempo, Santa Barbara, CA (USA)). May 1984. 205p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920401.

Differential financial, environmental, and social costs were determined for construction and operation of four identical 550-MW coal-burning plants when: (1) separated according to an arbitrary air quality criteria; and (2) consolidated at a single location. For an exemplar locale near Farmington, New Mexico, the construction and capital and lifetime O & M costs (in constant 1977 dollars) were calculated to be $510 million, or 10.5%, higher for the dispersed plants. In a generic sense, all environmental and social costs were found to be equal or greater for the dispersed siting option, although the differential environmental and social costs of from $11 to $69 million were small compared to the differential financial costs. A sensitivity analysis and application of the methodology to a hypothetical locale in the southeast did not change the basic conclusion: in a generic sense, consolidated plant siting is preferred to dispersed siting economically, environmentally, and socioeconomically. 21 references, 23 figures, 52 tables.

30684 **Developing an energy policy on power plant siting: the Utah experiment.** Hamilton, M.S. (Univ. of New Mexico, Albuquerque). *Journal of Energy Law and Policy;* 3: No. 1, 169-188(1982).

This article surveys the site selection experiences of the Kaiparowits Project and the Intermountain Power Project in Utah. It also traces the development of an energy policy for the state and the establishment of a unique intergovernmental coordination mechanism, the Utah Interagency Task Force on Power Plant Siting. The Utah experience affords a case study in policy adaptation designed to minimize unproductive political confrontation in regulatory forums. 76 references.

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30685 **(EPRI-EL—3397) Evaluation of advanced static VAR generators. Final report.** Cibulka, F.; Paice, D.A.; Gyugyi, L. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Research and Development Center). May 1984. 62p. EPRI-Research Reports Center, Box 50490 Palo Alto, CA 94303. Order Number TI84920404.

Three types of advanced static VAR generators (ASVGs) employing mainly solid-state switching devices with minimal use of conventional components have been defined and examined. Analysis of the power-doubling approach was supported by tests on a 100 kVA model. Candidate switches for the ASVGs were reviewed and gate-turn-off thyristors (GTOS) selected. Parameters of candidate GTOs from three manufacturers are given and insights provided for future, even higher rated devices. A comparison is made of the various types of ASVG and a conventional static VAR generator of the fixed-capacitor, thyristor-controlled reactor type. Recommendations are made for future developments.

30686 **(EPRI-EL—3415) Workshop proceedings: electrical testing of extruded-dielectric power transmission cables.** (Cable Technology Labs., Inc., New Brunswick, NJ (USA)). May 1984. 75p. (CONF-8104235—; CONF-8111207—). Electric Power Research Institute-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920355.

From EPRI workshop on electrical testing of extruded-dielectric power transmission cables; San Diego, CA, USA (9 Apr 1981).

These minutes record discussions concerning short and long-time electrical testing of extruded dielectric power cables rated 115 to 345 kV having an outer protective covering which prevents ingress of moisture from the environment. Opinions of personnel representing domestic and foreign cable manufacturers and users, material suppliers and independent testing organizations are presented. Guidelines for qualification of cables selected for testing at Waltz Mill, for electrical test procedures to be used at this facility to establish cable suitability and for factory electrical testing are presented.

30687 **(EPRI-EL—3425-Vol.1) Approach for determining transfer capability objectives. Volume 1. Methodology and application example. Final report.** Merrill, H.M.; Bhavaraju, M.P. (Power Technologies, Inc., Schenectady, NY (USA); Public Service Electric and Gas Research Corp., Newark, NJ (USA)). Mar 1984. 105p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920345.

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Transfer capability, the ability to transmit power from one area to another, is a measure of the strength of a transmission network. As such, adequacy of transfer capability is an important planning consideration. Planners have not had a comprehensive approach for setting transfer capability objectives. The purpose of this report was to assist in satisfying the need for such an approach. The approach devised recognizes the multiple and conflicting objectives with which a planner must deal. It leads to reasonable transfer capability objectives that take account of the practical options a utility has available and of the uncertainties it faces. The approach was successfully demonstrated on a large, realistic test system, derived from an existing power pool. Computer programs which can be used in applying the approach were developed and tested. This report is in two volumes. Volume 1 describes the transfer capability objectives approach. It includes a description of the test system study that was used to help develop and to demonstrate the approach. Volume 2 fills in details that are beyond the scope of Volume 1. Volume 2 also contains documentation of the computer programs.

30688 **(NP—4751457) Power pool in Norway. Annual report 1982.** (Samkjoeringen av Kraftverkene i Norge, Trondheim). 1983. 80p. (In Norwegian). NTIS (US Sales Only), PC A05/MF A01. Order Number DE84751457.

With a summary in English.

The power pool in Norway organizes and conducts the co-operation among the electrical power companies in the country. At the end of 1982 the association numbered 121 members. The integrated system of the power pool in Norway is interconnected and synchronously operated with the power systems of Sweden, Finland and Denmark. The Scandinavian system is connected to the Continental European system by direct current cables from Gothenburg (Sweden) and from Kristiansand (Norway) to Jutland (Denmark). Total electrical energy production in 1982 was 92 784 GWh, i.e. 0.4% lower than in 1981. Total consumption was 86 890 GWh, i.e. a decrease of 1.2% compared to the 1981 value. Peak demand for total consumption was 16 026 MW, i.e. 4.4% higher than in 1981. Total net export to Sweden and Denmark amounted to 6 138 GWh, including 482 GWh contractpower to Sweden. From the Sovjet Union there was an import of 6.3 GWh. The public consumption including grid losses, was 57 112 GWh. This was an increase of 1.3% compared to the 1981 value. If the effect of abnormal temperature is excluded, the increase is estimated to 4.2%. The corresponding peak load of 12 320 MW was registered on the 7th of January. The consumption in energy intensive industry was 25 628 GWh, i.e. a decrease of 5.0% compared to the 1981 value. 35 drawings, 23 tables.

21 NUCLEAR POWER PLANTS

REFER ALSO TO CITATION(S) 30406

30689 (EPRI-NP—3402-SR, pp 8.1-8.6) **Sampling water by membrane filtration for suspended solids in steam generating systems.** Stauffer, C. (Babcock & Wilcox Research, Alliance, OH). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

The sampling apparatus required, recommended sampling connection, and general procedure are described. The procedures for sampling may require modification due to local differences in system design, etc.

30690 (EPRI-NP—3402-SR, pp 10.1-10.2) **Sampling for corrosion products in high pressure fossil-fuel boilers: a literature survey.** Zoski, J.E. (Betz Laboratories, Inc., Trevose, PA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

There has been considerable interest in the proper techniques of obtaining representative corrosion product samples from high-purity Power Utility boiler systems. However, the bulk of the work done has been connected with nuclear steam generator systems. Very little work - certainly very little published work - has been done in connection with fossil - fuel fired systems. A computerized literature search was done as part of work for the NACE Task Group T-2-2. This Task Group is compiling a state-of-the-art report on Corrosion Product Sampling in High Purity Water. The computer search located the three references given in the Appendix of this report.

30691 (NUREG/CR—3604) **Bolting applications.** Czajkowski, C.J. (Brookhaven National Lab., Upton, NY (USA)). May 1984. Contract AC02-76CH00016. 301p. (BNL-NUREG—51735). NTIS, PC A14/MF A01; 1 - GPO $7.50; GPO Dep. Order Number DE84012736.

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An investigation of bolting practices specific to the nuclear industry was performed. The report covered a large spectrum of topics e.g. bolts embedded in concrete, specifications, inspection of bolting, both at receipt and inservice. Plots of preload versus yield strength for different bolting materials in different environments are presented as well as information relative to the stress corrosion cracking resistance of the more recent reactor internals bolting materials A286 and Inconel X-750. Part of the report contains input by Standard Pressed Steel Inc. (a bolting consultant) relative to bolting standards, cottering methods and potential areas for bolting improvement.

30692 (NUREG/CR—3726) **Simulator fidelity and training effectiveness: a comprehensive bibliography with selected annotations.** Rankin, W.L.; Bolton, P.A.; Shikiar, R.; Saari, L.M. (Battelle Human Affairs Research Center, Seattle, WA (USA)). May 1984. Contract AC06-76RL01830. 130p. (PNL—4765; BHARC—400/83/008). NTIS, PC A07/MF A01; 1 - GPO $5.50; GPO Dep. Order Number DE84012058.

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This document contains a comprehensive bibliography on the topic of simulator fidelity and training effectiveness, prepared during the preliminary phases of work on an NRC-sponsored project on the Role of Nuclear Power Plant Simulators in Operator Licensing and Training. Section A of the document is an annotated bibliography consisting of articles and reports with relevance to the psychological aspects of simulator fidelity and the effectiveness of training simulators in a variety of settings, including military. The annotated items are drawn from a more comprehensive bibliography, presented in Section B, listing documents treating the role of simulators in operator training both in the nuclear industry and elsewhere.

2101 Power Reactors, Non-breeding, Light-water Moderated, Boiling Water Cooled

REFER ALSO TO CITATION(S) 30329, 30714, 30827, 30831, 30839, 30840, 30865, 30867, 30883, 30884, 30885, 30886, 30887, 30888, 30890, 30892, 30896, 30898, 30899, 30900, 30901, 30908, 30909, 30912, 30913, 30914, 30915, 30923, 30925, 30929, 30936, 30937, 30939, 30941, 30942, 30944, 30947, 30949, 30950, 30951, 30955, 30964

30693 (EPRI-NP—3402-SR) **Proceedings: workshop on corrosion product sampling from hot water systems.** Solomon, Y. (ed.). (Electric Power Research Inst., Palo Alto, CA (USA)). Mar 1984. 274p. (CONF-8308169—). Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343.

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

An EPRI sponsored workshop on Sampling of Corrosion products from Hot Water Systems was held at Blacksburg, Virginia on August 18 to 19, 1983. The main body of this report contains the materials provided by the speakers, their visual aids, and, generally, an abstract of the presentation. These presentations have not been edited.

30694 (EPRI-NP—3402-SR, pp 1.1-1.18) **Particulate transport theory: relationship to sample system design.** Beal, S.K. (SC & A, Inc., McLean, VA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Using only the two well-established principles that mass is conserved, and that the deposition rate is proportional to the average concentration, it is shown that to minimize the loss of particles to the pipe walls, sampling lines should be short, fat, round, and vertical. Using less well-established principles, it is shown that the fluid velocity in the sampling line should be as low as possible in vertical sections of the line and perhaps higher in horizontal sections. A final guideline is that the sample fluid should be cooled as close to the sample point as possible.

30695 (EPRI-NP—3402-SR, pp 3.1-3.32) **Use of ion exchange filters for corrosion product sampling.** Noe, M.; Beslu, P.; Heres, A.; Anthoni, S.; Frejaville, G. (Centre d'Etudes Nucleaires, Cadarache, France). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

The use of ion exchange filters, associated with x-ray fluorescence for the analysis of corrosion products from reactors coolant is described. Results obtained with this technique and alternate

procedures in experimental loops and in power reactors, under normal operation and during shutdown sequences are discussed. A comparison with radiochemical data has permitted to improve the sampling procedure. An indication is given, on the basis of $^{58}Co/^{60}Co$ ratio, that soluble species from low temperature sampling may be generated from deposit in the sampling line. This represents a serious limitation to the adequacy of such sampling procedures.

30696 (EPRI-NP—3402-SR, pp 15.1-15.7) **Reactor crud sampling.** Divine, J.R. (Pacific Northwest Lab., Richland, WA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

The validity of hot crud sampling is dependent on two factors - whether the sample taken from the process line is representative and whether the analysis is representative of the sample taken. In the first case it is necessary to ensure the sampler inlet/probe is in a representative portion of the line - for turbulent flow a probe should be downstream of major disturbances and either penetrate the boundary layer or have sufficient flow to eliminate it. The second factor has two aspects. The corrosion products, soluble or insoluble, should not deposit on the sample line or, if deposited, should be removable from the sample line. It is necessary that the filter be able to distinguish between true filterables and nonfilterables that deposit on the filter. Use of inert metal sampler, that is one that does not contain the components as the corrosion products, makes it possible to remove any deposits for analysis. Differentiation between deposited particles and solubles can not be made for these deposits. The first criterion for obtaining representative filter samples is to maintain isothermal conditions to prevent changes in quantity, size, or composition in the filterables. The second criterion is to use nonconductive filters to minimize the deposition of nonfilterables.

30697 (EPRI-NP—3402-SR, pp 18.1-18.11) **Sampling of metallic impurities in BWR's.** Sundberg, L.L. (General Electric Co., San Jose, CA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Viewgraphs are included for a paper presented concerning sampling methods and water chemistry characteristics for the primary coolant circuit of a BWR type reactor.

30698 **(EPRI-NP—3444) Wear measurements of nuclear power plant components. Final report.** Dufrane, K.F.; Young, T.R.; LaDuca, J.T.; Mellor, P.L. (Battelle Columbus Labs., OH (USA); Combustion Engineering, Inc., Windsor, CT (USA)). May 1984. 47p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920411.

The objective of this study is to measure the amount of cobalt released to the primary coolant by wear of components in the primary circuit of nuclear power plants. Since detailed measurement data prior to wear were not available for field components, the measurements were made relative to nearby unworn reference surfaces. In most cases a profilometer was used to ascertain the worn profiles. Wear of components that were too large to be moved or that were contaminated was measured by preparing plastic replicas of the worn regions for subsequent profilometer measurements. Measurements were performed on the following components: (1) two PWR control element drive mechanisms; (2) a PWR main coolant pump shaft; (3) eight PWR gate valve discs; (4) two PWR horizontal swing check valve bushings; (5) four BWR feedwater regulator valves; (6) a BWR feedwater swing check valve; and (7) two BWR two-stage pilot relief valves. Pre- and post-test weight change measurements also were used to determine the wear of the two control element drive mechanisms. The wear measurements showed that the cobalt release rate varied from 0.02 to 84 grams of cobalt per year.

30699 **(EPRI-NP—3468) Demonstration of 9x9 assemblies for BWRs. Final report.** Kayser, W.V. (Exxon Nuclear Co., Inc., Richland, WA (USA)). May 1984. 182p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920423.

This study compares the performance of an Exxon Nuclear Company BWR fuel design using a 9x9 rod array with the performance for a corresponding 8x8 array. The thermal-hydraulic calculations show that hydraulic compatibility between 8x8 and 9x9 fuel designs is achievable. The increased surface area of 9x9 fuel is found to improve thermal margin, since it reduces surface heat flux. In this regard, the present study shows a 2% improvement in operating MCPR for equal assembly power levels between 9x9 and 8x8 fuel designs. Additional margin may occur as a result of critical heat flux test programs for 9x9 fuel. The emergency core cooling system (ECCS) analysis performed in this study indicates equal or improved ECCS limits for 9x9 fuel over 8x8 fuel. This improvement stems from the lower fuel-operating temperatures and the lower fission-gas release of 9x9 fuel. Coupled hydraulic-neutronic stability calculations show the core remaining stable within the anticipated operating regions of the flow power map, with 9x9 decay ratios slightly higher than 8x8 values. The increase in the power decay ratio results from the faster thermal response of the 9x9 fuel to power changes and from higher void reactivity associated with the higher burnup of the design 9x9 fuel. Evaluation of the fuel assembly design to seismic and flow-induced vibrational loads showed large margins to fuel damage limits.

30700 **(EPRI-NP—3490) Comparison of advanced BWR fuel designs with current standard designs. Final report.** Goldstein, L.; Epstein, R.; Santucci, J.; Sheppard, K.; Strasser, A. (Stoller (S.M.) Corp., New York (USA)). May 1984. 159p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920382.

Objective of this generic study is to provide a comparison of the design features and the potential performance levels of improved fuel designs currently offered for BWRs. The improved designs evaluated by this study and compared to the standard 8x8 fuel, are: P8x8R (GE-6) fuel with zirconium barrier clad, currently being manufactured by General Electric, 9x9 fuel offered by Exxon Nuclear, and 8x8 (QUAD+) fuel offered by Westinghouse Electric.

30701 **(EPRI-NP—3517) Effects of variations in BWR water chemistry on the electrochemical potential of stainless steel and other metals.** Leibovitz, J.; Kassen, W.R.; Sawochka, S.G. (NWT Corp., San Jose, CA (USA)). May 1984. 64p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920405.

Effects of a variety of chemical environments on the electrochemical potential (ECP) of prefilmed 304 SS, 316 SS, low chromium steel (8% chrome), silver, gold and Zircaloy-2 were measured. In particular, the effects of dissolved hydrogen and oxygen concentrations, and exposure to dilute solutions of sodium chloride, sodium sulfate, sodium hydroxide, sulfuric acid, and hydrochloric acid were considered. Filming of the ferrous materials significantly affected the ECP response to oxygen and hydrogen in the water. In particular, the elevated hydrogen concentration associated with the proposed BWR alternate water chemistry (AWC) increased the ECP of filmed materials when the oxygen concentration was held constant at levels of interest with AWC operation. Prefilming of specimens for several thousand hours in the chemistry of interest prior to testing for susceptibility to IGSCC appears advisable. ECP responses of the ferrous materials to the selected impurities corresponded approximately to those calculated from their predicted effect on pH at temperature. However, interaction on the impurities with the films was indicated in some cases by a lack of total ECP reversibility with impurity removal.

30702 **(EPRI-NP—3536-SR) EPRI research on power plant mechanical auxiliaries.** Dimmer, J.; Diaz-Tous, I.; White, J.C.; Brooks, B.; Hirota, N.; Kolar, M. (Electric Power Research Inst., Palo Alto, CA (USA)). May 1984. 199p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920406.

This document summarizes current and completed EPRI work related to power plant mechanical auxiliaries in terms of individual projects and contracts. It was prepared for the EPRI Mechanical Auxiliaries Coordinating Committee to provide a guide to these activities primarily for the benefit of utilities and others concerned with such equipment. Each activity summary includes a statement of work scope and approach, plus objectives for current work or results of completed activities. Any publications, the contractor, and key dates also are included. The summaries generally describe the status of the work as of August 31, 1983, but some information is more recent.

30703 **(HEDL—7448) PSF Blind Test instructions and data packages.** (Hanford Engineering Development Lab., Richland, WA (USA)). 12 Apr 1983. Contract AC06-76FF02170. 182p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84012370.

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Information is presented concerning information on an improved damage exposure unit: DPA, for LWR pressure vessel and support structure surveillance; report preparation instructions; physics-dosimetry-time-temperature data package; metallurgy (C/sub v/, tensile, K/sub jc/) data package; and metallurgy (compression) data package.

30704 **(HEDL—7449) PSF blind test SSC, SPVC, and SVBC physics-dosimetry-metallurgy data packages.** (Hanford Engineering Development Lab., Richland, WA (USA)). 17 Feb 1984. Contract AC06-76FF02170. 183p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84012385.

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Information is presented concerning the final PSF radiometric data; calculated spectral fluences and dosimeter activities for the metallurgical blind test irradiations at the ORR-PSF; fabrication data package for HEDL dosimetry in the ORNL Poolside Facility LWR pressure vessel mock-up irradiation; SSC-1; NUREG-CR-3457; and NUREG-CR-3295.

30705 **A mechanism of radioactive corrosion product buildup on the stainless steel surface used in the primary cooling systems of boiling water reactors.** Uchida, S.; Ibe, E.; Meguro, Y.; Ozawa, Y. (Hitachi Ltd., Energy Research Laboratory Moriyamacho, Hitachi, Ibaraki 316). *Nuclear Technology;* **59**: No. 3, 498-508(Dec 1982).

The mechanisms of radioactive corrosion product buildup on the stainless steel surface used for the primary cooling systems of boiling water reactors have been considered and the following conclusions obtained. Ionic species are taken into a spinel structure on the surface and the deposition rate is expressed as a function of exposure time and temperature of contact water. Crud is deposited on the oxide layers at a rate in proportion to the 0.82th power of the Reynolds number. Some ionic species are released from the crud on the oxide layers and are taken into a spinel structure as in item 1. Their contribution to the dose rate buildup is dominant at a dirty plant (which has a high iron content in the feedwater system). The spinel structure grows at the boundary between the oxide layers and the base metal as a result of dry corrosion of stainless steel, which involves ionic species diffusing through the oxide layers. The mechanism is supported by data from destructive measurements of the reactor water cleanup piping at Tsuruga Nuclear Power Plant.

30706 **Neutron emission characteristics of spent boiling water reactor fuel.** Yokoyama, T.; Tamura, T. (Nippon Atomic Industry Group Co., Ltd. NAIG Nuclear Research Laboratory 4-1 Ukishima-cho, Kawasaki-ku, Kawasaki, 210). *Nuclear Technology;* **57**: No. 3, 372-388(Jun 1982).

Calculations have been made to investigate the dependence of the primary neutron emission rate (the neutron source strength) of spent boiling water reactor (BWR) fuel assemblies on the irradiation parameters; initial ^{235}U enrichment, void fraction, power density, and operation history. A BWR lattice cell calculation code, which was verified by experiments, has been used to calculate the buildup of transuranium isotopes. The neutron emission rate was split into three components: ^{242}Cm, ^{244}Cm, and other nuclides. The effects of the irradiation parameters have been studied for each of the three components. The energy spectra of the primary neutrons emitted by the irradiated fuel have been calculated parametrically. The calculations have elucidated the neutron emission characteristics of the spent BWR fuel assemblies and provided the basic information to be used for: the neutron-shielding design for spent-fuel storage facilities and transportation casks; the feasibility study of the startup of a BWR without radioisotope neutron source; and the application of passive neutron method to the nondestructive determination of burnup and plutonium contents in spent BWR fuels.

30707 **Dynamic analysis of the condensate feedwater system in boiling water reactor plants.** Tanji, J.; Omori, T. (Hitachi Energy Research Laboratory, Hitachi, Ltd. 1168 Moriyama-cho, Hitachi-shi, Ibaraki-ken 316). *Nuclear Technology;* **57**: No. 2, 163-174(May 1982).

The computer code, CONFAC, has been developed for dynamic analysis of the condensate feedwater system in boiling water reactor plants. This code simulates the hydrodynamics in the piping system, the pump dynamics, and the feedwater controller in order to clarify the system transient characteristics in such cases as pump trip incidents. Code verification was performed by comparison between analytical results and actual plant operational data. Satisfactory agreement was obtained. With the code, appropriate pump start/stop interlocks were estimated for preventing pump cavitation in pump trip incidents.

30708 **Boiling water reactor cycle extension operation.** Fullmer, G.C. (General Electric Company Nuclear Energy Business Operations, 175 Curtner Avenue San Jose, California 95125). *Nuclear Technology;* **57**: 58-64(Apr 1982).

The refueling of a nuclear power reactor, involving opening of the pressure vessel and associated plant maintenance, is characteristically planned to occur at a frequency on the order of a year or longer. The length of a boiling water reactor (BWR) operating cycle, the time between successive refueling shutdowns, may be extended several weeks to several months beyond normal "reactivity life" with proper planning. Reactivity for extended operation is available through the use of the negative moderator and fuel reactivity coefficient effects--especially the BWR void coefficient. The coastdown power reduction mode has been applied in 70% of recent cycles. Increased core flow and feedwater temperature reduction have also been used for cycle extension and to enhance operating maneuverability.

30709 **Influence of partial blockage of a BWR bundle on heat transfer, cladding temperature, and quenching during bottom flooding or top spraying under simulated LOCA conditions.** Brand, B.; Gaul, H.P.; Sarkar, J. (Kraftwerk Union Aktiengesellschaft Abt. R 513, Hammerbacherstrasse 12 + 14, D-8520 Erlangen). *Nuclear Technology;* **56**: No. 1, 128-133(Jan 1982).

In a test facility with two parallel boiling water reactor fuel assemblies, experiments were carried out with top spray and bottom flooding, simulating loss-of-coolant accident (LOCA) conditions. The flow area restriction, caused by the ballooning of fuel rod cladding within one of the bundles, was provided by blockage plates, which had reductions of 37% in one case and in a second series 70% of the flow area. Test parameters were system pressure (1, 5, and 10 bars), spray (0.68 and 1.02 m^3/h) and flooding rates (1.5,2, and 3.3 cm/s), power input (520 and 614 kW), and the initial cladding temperature (600 and 800°C at midplane) of the heaters. The test results showed no significant variations from those without blockage, except in the blocked region. An enhancement of heat transfer was observed in a close region downstream from the blockage in cases such as bottom flooding and top spray tests. The results will serve the purpose of code verification for reactor LOCA analysis.

30710 **Fuel cycle cost considerations of increased discharge burnups.** Scherpereel, L.R.; Frank, F.J. (Westinghouse Nuclear Commercial Operations Division Fuel & Field Services Evaluations, P.O. Box 355 Pittsburgh, Pennsylvania 15230). *Nuclear Technology;* **56**: No. 1, 106-111(Jan 1982).

Evaluations are presented that indicate the attainment of increased discharge burnups in light water reactors will depend on economic factors particular to individual operators. In addition to pure resource conserving effects and assuming continued reliable fuel performance, a substantial economic incentive must exist to justify the longer operating times necessary to achieve higher burnups. Whether such incentive will exist or not will depend on relative price levels of all fuel cycle cost components, utility operating practices, and resolution of uncertainties associated with the back-end of the fuel cycle. It is concluded that implementation of increased burnups will continue at a graduated pace similar to past experience, rather than finding universal acceptance of particular increased levels at any particular time.

30711 **The role of plutonium-238 in nuclear fuel cycles.** Massey, J.V.; Schneider, A. (Georgia Institute of Technology School of Nuclear Engineering and Health Physics Atlanta, Georgia 30332). *Nuclear Technology;* **56**: No. 1, 55-71(Jan 1982).

The use of a ^{238}Pu "heat spike" has been proposed to render reactor-grade plutonium unattractive as a weapons material. The technical feasibility of nuclear fuel cycles with plutonium contaiing 5 to 8% ^{238}Pu was studied by investigating the production of ^{238}Pu and its precursors (^{236}U, ^{237}Np, ^{241}Am, and ^{242}Cm) in light water reactors (LWRs) and in liquid metal fast breeder reactors (LMFBRs). The effects of ^{238}Pu and its precursors on reactor core behavior and fuel cycle operations were also analyzed. Modified LWR fuel management schemes allow the ^{238}Pu content to build up to 5% in three reactor fuel cycles and sufficient excess neptunium is generated for the concept to be expanded to all reactors in the fuel cycle in a timely manner. The production of ^{238}Pu in LMFBRs is not self-sufficient. Tandem LWR-LMFBR fuel cycles (four LWRs to one LMFBR) are required to maintain a sufficient ^{238}Pu level and a neptunium balance. The concept required small, but significant, increases in the initial fissile content of LWR fuel. Other LWR and all LMFBR core physics and reactivity parameters were not adversely affected. Required modifications to fuel cycle industries are within the present state of technology. An economic evaluation showed heat-spiked fuel cycles to be more costly than normal recycle fuel cycles (about 10 to 15% for LWRs and about 30% for LMFBRs), but to be 10 to 15% less expensive than the LWR throwaway fuel cycle. In summary, the heat spike concept was found to be technically and economically feasible, but its adoption for LMFBRs might retard breeder introduction and growth schedules.

30712 **Numerical simulation of boiling water reactor vent-clearing hydrodynamics.** Nichols, B.D.; Hirt, C.W. (University of California, Los Alamos Scientific Laboratory Theoretical Division, Group T-3, P.O. Box 1663, Los Alamos, New Mexico 87545). *Nuclear Science and Engineering;* **73**: No. 2, 196-209(Feb 1980).

Pressure suppression pools used in nuclear reactors are subject to hydrodynamic processes involving complicated free surface configurations. A new numerical method, SOLA-VOF, developed to handle such problems is described and evaluated through comparisons with laboratory test data. Results from numerous computations provide a detailed understanding of the hydrodynamic phenomena associated with boiling water reactor vent-clearing processes. In addition, calculations show the sensitivity of the results to variations in the water vapor content, vent submergence depth, vent orifice size, and to the influence of fluid-structure interactions.

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REFER ALSO TO CITATION(S) 30290, 30329, 30693, 30694, 30695, 30696, 30698, 30702, 30703, 30704, 30710, 30711, 30793, 30828, 30833, 30838, 30840, 30842, 30843, 30844, 30857, 30858, 30864, 30867, 30869, 30871, 30872, 30880, 30881, 30882, 30884, 30885, 30886, 30887, 30888, 30889, 30891, 30893, 30894, 30895, 30896, 30897, 30898, 30899, 30900, 30902, 30904, 30905, 30907, 30909, 30910, 30911, 30912, 30914, 30915, 30923, 30925, 30929, 30936, 30937, 30939, 30941, 30944, 30947, 30949, 30950, 30951, 30955, 30956, 30963, 30964

30713 **(BNFL-P—1) Proof of evidence [BNFL 2]. Sizewell 'B' power station public inquiry.** Avery, D.G. (British Nuclear Fuels Ltd., Risley). 12 Nov 1982. 96p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84701708.

It is shown that the fuel cycle requirements of the proposed Sizewell B nuclear power station could be supplied by British Nuclear Fuels Limited. It is demonstrated that any facilities which may be required in the future could be provided from established technology. Evidence is presented in support of the responses which the Company has made to requests from the CEGB for guidance on the charges it should assume for some fuel cycle services in a variety of circumstances. Reference is made throughout to the fuel cycle needs of other possible future nuclear power stations as postulated by CEGB in its Statement of Case.

30714 **(CONF-840516—6) IPRDS: component histories and nuclear plant aging.** Borkowski, R.J.; Kahl, W.K. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 10p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012343.

From International symposium on aging in tests of safety equipment for nuclear power plants; Paris, France (15 May 1984).

A comprehensive assessment of nuclear power plant component operating histories, maintenance histories, and design and fabrication details is essential to understanding aging phenomena. As part of the In-Plant Reliability Data System (IPRDS), an attempt is being made to collect and analyze such information from a sampling of US nuclear power plants. Utilizing the IPRDS, one can reconstruct the failure history of the components and gain new insight into the causes and modes of failures resulting from normal or premature aging. This information assembled from the IPRDS can be combined with operating histories and postservice component inspection results for cradle-to-grave assessments of component aging under operating conditions. A comprehensive aging assessment can then be used to provide guidelines for improving the detection, monitoring, and mitigation of aging-related failures.

30715 **(EPRI-NP—3068) Investigation of steam generator corrosion products under typical PWR operating conditions. Final report.** Patel, B.M.; Hayes, J.K. (Combustion Engineering, Inc., Chattanooga, TN (USA). Chattanooga Nuclear Operations). May 1984. 376p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920395.

The basic objective of this project was to develop an understanding of the means by which small corrosion particles entering the PWR steam generators (1 to 3 microns average particle size based on CE field data) deposit on the tube-sheets. Another objective of this project was to study dropout and reentrainment of the corrosion particles and evaluate effectiveness of high capacity blowdown systems. A literature survey was performed to acquire field data from various operating PWR plants with regards to corrosion products composition, concentration, size distribution, morphology, and water chemistry environment. The survey also included study of corrosion products growth mechanisms, parameters that could affect growth, and possible deposition processes. A multiple autoclave concept was developed and tested for evaluating the large number of variables that may affect corrosion products growth. A limited number of autoclave tests were performed using magnetite, copper and nickel corrosion particles. Several corrosion particle growth mechanisms were identified in these tests with agglomeration appearing to be the most predominant.

30716 (EPRI-NP—3275-Vol.3) Causes of denting. Volume 3. Plant chemistry correlations. Final report. deSilva, S.G.; Wolfe, C.R. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Technology Div.). May 1984. 104p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920376.

Subtask 220 of EPRI/Westinghouse Project S157-1 examined the relationship between field denting experience and secondary system operating conditions. The study was limited to a select representative group of operating plants. The results of the study indicate that chloride and oxidizing species have synergistic roles in the initiation of denting. A model is proposed to relate the chloride-oxygen synergism with denting.

30717 (EPRI-NP—3372-Vol.1) Reactor coolant high-temperature filtration. Volume 1. Summary report. Final report. Troy, M. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Technology Div.). May 1984. 35p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920402.

The results of a 4-year effort to develop a prototype high temperature reactor coolant magnetic filtration system are reviewed. The evidence, both experimental and analytical, for the potential effectiveness of high temperature filtration in reducing by at least a factor of 3 the occupational radiation exposures in PWR plants is summarized. Designs for a prototype high temperature filtration system to achieve this benefit are presented with an evaluation of cost and schedule for backfit of one design to an existing PWR plant.

30718 (EPRI-NP—3372-Vol.2) Reactor coolant high-temperature filtration. Volume 2. Evaluation of effectiveness in reducing occupational radiation exposure. Final report. Kang, S.; Solomon, Y.; Troy, M. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Technology Div.). May 1984. 114p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920384.

The results of a 4-year effort to develop a prototype high temperature reactor coolant magnetic filtration system are reviewed. The evidence, both experimental and analytical, for the potential effectiveness of high temperature filtration in reducing by at least a factor of 3 the occupational radiation exposures in PWR plants is summarized. Designs for a prototype high temperature filtration system to achieve this benefit are presented with an evaluation of cost and schedule for backfit of one design to an existing PWR plant.

30719 (EPRI-NP—3372-Vol.3) Reactor coolant high-temperature filtration. Volume 3. Conceptual system designs and licensing concerns. Final report. Corpora, G.J.; Grover, J.L.; Masch, M.L.; Schulz, T.L.; Shields, S.; Sterrett, S.G.; Troy, M. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Technology Div.). May 1984. 143p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920424.

Conceptual fluid system designs are presented for high temperature reactor coolant magnetic filtration systems. One of these is intended for application to any pressurized water reactor plant and is designated the generic design. The other is intended specifically for pressurized water reactors of the Byron design having RCS loops equipped with loop stop valves. A licensing issues evaluation for the Byron concept is also presented. Each conceptual design includes full details of the required system and equipment functional requirements complete with engineering flow diagrams.

30720 (EPRI-NP—3372-Vol.4) Reactor coolant high-temperature filtration. Volume 4. Engineering details of the Byron nuclear station high-temperature filtration facility. Final report. Nelson, R.A.; Szupillo, J.E. (Sargent and Lundy, Chicago, IL (USA)). May 1984. 83p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920403.

The results of a 4-year effort to develop a prototype high temperature reactor coolant magnetic filtration system are reviewed. The evidence, both experimental and analytical, for the potential effectiveness of high temperature filtration in reducing by at least a factor of 3 the occupational radiation exposures in PWR plants is summarized. Designs for a prototype high temperature filtration system to achieve this benefit are presented with an evaluation of cost and schedule for backfit of one design to an existing PWR plant.

30721 (EPRI-NP—3402-SR, pp 4.1-4.11) Effect of filter-particle interactions on the performance of filters. Smith-Magowan, D. (Westinghouse R & D Center, Pittsburgh, PA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Viewgraphs are included for the paper presented concerning the performance of filters in the primary coolant circuits of PWR type reactors.

30722 (EPRI-NP—3402-SR, pp 5.1-5.11) Steam generator needs and practices: uses of data. Welty, C. (EPRI, Palo Alto, CA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Viewgraphs are included for a paper presented concerning the need to determine the type, source, and cycle transport characteristics of filterable and nonfilterable particulates which can ultimately deposit in the steam generator of PWR type reactors.

30723 (EPRI-NP—3402-SR, pp 6.1-6.9) Corrosion product sampling from hot water systems. Bell, M.J. (NWT Corp., Roanolee, VA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

A Millipore 0.45-micron membrane was used to collect filterable species from a continuous sample flow of approximately 100 cc/min. Sampling periods range from 1 to 7 days. Three cation ion exchange resin impregnated membranes were inserted in the filter holder beneath the Millipore membrane to collect soluble cationic species and possibly colloidal species. Membranes were dissolved using perchloric and hydrochloric acid over a period of several days with final sample analysis by atomic absorption. This sample collection method allows long term averaging of corrosion product concentrations thereby providing a firm basis for performing mass balances around specific components, such as the steam generator. In addition, it is possible to identify major sources of corrosion products within the feedwater system.

30724 (EPRI-NP—3402-SR, pp 7.1-7.23) Corrosion product sampling experience at Babcock & Wilson. Stauffer, C.C. (Babcock & Wilcox Research, Alliance, OH). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Viewgraphs are included for a paper presented concerning the sampling methods and chemical composition of corrosion products from PWR type reactor steam systems.

30725 (EPRI-NP—3402-SR, pp 9.1-9.14) Corrosion product transport at Sequoyah Nuclear Plant. Davis, J. (Tennessee Valley Authority, Chattanooga, TN). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Concerns relating to steam generator corrosion problems led to measurements of the levels of corrosion products at the Tennessee Valley Authority's Sequoyah Nuclear Plant. The goals of the measurement program were to quantify transport to the steam generators and to identify, if possible, the major sources of corrosion

products. In order to get an idea of the long term levels of corrosion products, a number of integrated (one to seven day) samples were taken. Filterable corrosion products (Fe, Cu, ni, and Zn) were collected on a 0.45μ millipore filter in series with a single strong acid cation membrane. The two filters were dissolved in acid and analyzed by atomic absorption spectrophotometry. Some data on nonfilterable metals was collected using ion exchange techniques.

30726 (EPRI-NP—3402-SR, pp 12.1-12.19) **Uses of data: crud transport processes.** Wood, C.J. (EPRI, Palo Alto, CA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

In order to reduce radiation field buildup by improving the water chemistry specification, understanding of the complete crud transport process is required. The chemical composition and morphology of crud on fuel surfacces and of corrosion films on out-of-core surfaces have been determined, but further data is required on the chemical composition and form (e.g. soluble, colloidal or particulate) of material circulating in the water. The nature of the circulating material is known to change with chemistry, temperature and time; sampling techniques that will determine the form of the material as it is in the reactor coolant are required.

30727 (EPRI-NP—3402-SR, pp 13.1-13.12) **hot reactor coolant sampling: Westinghouse approach.** Roesmer, J. (Westinghouse Electric Corp., Pittsburgh, PA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Viewgraphs are included for a paper presented concerning the corrosion product transport and the sampling methods for primary coolant circuits of PWR type reactors.

30728 (EPRI-NP—3402-SR, pp 16.1-16.13) **Multi-capillary isokinetic sampling head.** Bird, E.J. (United Kingdom Atomic Energy Authority, Winfrith, England). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Viewgraphs are included for the paper presented concerning a sampler design for use in the primary coolant circuit of a PWR type reactor.

30729 (EPRI-NP—3402-SR, pp 17.1-17.4) **Requirement for isokinetic capillary sampling systems for PWR primary coolant circuits.** Bird, E.J. (United Kingdom Atomic Energy Authority, Winfrith, England). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Sampling of the coolant of a PWR is required for two reasons: to control the chemistry within the required specifications relating to both impurities and also the deliberate additions of Li, B and H_2; and to monitor circuit activity and coolant borne corrosion products. These two objectives have different purposes and require rather different amounts of sophistication in the sampling system.

30730 **(EPRI-NP—3463) Coolant chemistry effects on radioactivity at two pressurized water reactor plants.** Bergmann, C.A.; Roesmer, J. (Westinghouse Electric Corp., Pittsburgh, PA (USA). Nuclear Technology Div.). Mar 1984. 205p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920366.

Includes 4 sheets of 24x reduction microfiche.

The in-core, out-of-core, circulating activities, and radiation levels measured in the Beaver Valley No. 1 and Trojan nuclear plants are presented and evaluated in this report. The data were obtained during the first and second cycle of operation of both plants, and the completion of the third and fourth cycles in the Trojan plant. The gathering and presentation of these data was part of an effort to aid in defining the role of operation with two different types of coolant chemistries, coordinated lithium-boron and low lithium, on radioactivity and crud transport in the primary system of the two plants. The report contains a description of how the data were obtained, presentation of the data, and observations and conclusions. It was concluded that operation with coordinated lithium-boron chemistry resulted in lesser core crud deposits, lesser generation of nickel and consequently Co-58, and lesser radiation levels on cold leg piping, compared to operation with low lithium chemistry. It was also found that changing the coolant chemistry from low lithium in the first cycle to coordinated lithium-boron in the second cycle resulted in much the same differences as noted between one plant operating with low lithium and another with coordinated lithium-boron. Therefore, it was recommended that plants operate with coordinated lithium-boron chemistry control from startup to minimize crud deposition on cores and subsequent out-of-core radiation level buildup.

30731 **(EPRI-NP—3491) Long-term inspection requirements for PWR pump casings. Final report.** Umino, D.T.; Rao, A.K. (Nutech, San Jose, CA (USA)). May 1984. 44p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920377.

EPRI has undertaken a series of projects to investigate the long-term inspection requirements of nuclear power plant components. This report contains the evaluation of the primary coolant pump-casing inspection requirements. In this study corrosion, casting defects, repairs history, and material property degradation issues were defined, and the results integrated into a limiting-case flaw analysis study. The work on defects and repairs was completed by George Fischer, Ltd. The results suggest generic justification for deferring the 10-year volumetric inspection requirement for both the Type E and Type F pumps on the basis of: (1) the generic analysis work described herein; (2) the radiography and visual inspection of four units of the thick-wall, Type F pump casings, which indicated no detectable flaw growth or change; and (3) the good operating performance of pump casings to date.

30732 **(INIS-mf—8714) Investigations on flow-induced vibrations and fluid-elastic phenomena in PWR-models.** Hartermann, R.U. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Technische Fakultaet). 25 May 1981. 143p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84780265.

This paper contributes to the study of fluid-dynamical excitation mechanisms and fluid-elastic effects in nuclear reactor systems. Based on small-scale model measurements an attempt is made to estimate the effect of fluid excitation on structural oscillations, and to find out wheather these phenomena can be observed in model investigations and transformed to large-scale systems. In order to separate the effects of flow excitation from the structural motion due to the nuclear reactions, air and water have been used as flow media in two model systems. The wall pressure spectra measured at different positions show, that only the mechanism of flow turbulence can give a significant contribution to the excitation. Flow excited acoustic effects could only be detected in the model system operated with air; these are, however, negligeable in the case of water. The turbulent contributions in the wall pressure spectra of both model systems can be related with a sufficient degree of precision using the laws of fluid mechanics and a constant Strouhal-number. There is also experimental evidence for a limited influence of Reynolds-number on flow excitation. More detailed information can only be obtained from additional experimental data of large-scale model systems.

30733 **(LA-UR—84-1650) Two-field and drift-flux models with applications to nuclear reactor safety.** Travis, J.R. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 16p. (CONF-8405164—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012456.

From IAEA technical committee/workshop on the uses of computer codes for nuclear reactor safety analysis; Varna, Bulgaria (29 May 1984).

Portions are illegible in microfiche products.

The ideas of the two-field (6 equation model) and drift-flux (4 equation model) description of two-phase flows are presented. Several example calculations relating to reactor safety are discussed and comparisons of the numerical results and experimental data are shown to be in good agreement.

30734 (NUREG—0698-Rev.2) NRC plan for cleanup operations at Three Mile Island Unit 2. Rev. 2. Masnik, M.T.; Snyder, B.J. (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Mar 1984. 37p. NTIS, PC A03/MF A01 - GPO* $3.75. Order Number DE84901044.

This report updates a plan that defines NRC's role in cleanup operations at Three Mile Island Unit 2 (TMI-2) and outlines NRC's regulatory responsibilities in fulfilling this role. These responsibilities include reviewing and approving General Public Utilities Nuclear Corporation (the licensee) proposals for cleanup actions, overseeing the licensee's implementation of approved activities, coordinating wih other federal and state governmental agencies on their activities in the cleanup, and informing local officials and the public about the status of the cleanup. Since the initial issuance of this NRC Plan in July 1980, this office has issued the Final NRC Programmatic Environmental Impact Statement (PEIS) related to the entire TMI-2 cleanup and a draft Supplement to the PEIS related to occupational radiation exposure. Additionally, a number of developments have occurred which will have an impact on the course of cleanup operations. This revision provides a discussion of these developments, specifically in the areas of the functinal role of the NRC in cleanup operations, the cleanup schedule, and the current status of the cleanup. The plan also discusses NRC's perceived role in future cleanup activities.

30735 Some neutron physical consequences of maximizing the conversion ratio of pressurized water reactors operated in the uranium-plutonium cycle. Penndorf, K.; Bunemann, D.; Schult, F. (GKSS Research Center Institute of Physics, Post Box 160, 2054 Geesthacht). *Nuclear Technology;* **59**: No. 2, 256-269(Nov 1982).

Maximum conversion ratios of Pu/U mixtures in a pressurized water reactor (PWR)-like open rod lattice core are assessed complying with established data of thermal design, allowing for agreeable discharge burnup values, and utilizing plutonium from PWRs with present time fuel management or with that expected for the near future. Void reactivity, temperature coefficients, and control rod requirements are discussed with respect to their compatibility with the usual PWR design principles. While the temperature coefficients show a completely satisfying behavior, the core control requirements lead to design inconveniences, which nevertheless can be overcome. A crucial constraint, however, is the void reactivity, which limits the specific plutonium content. From the economical point of view, high conversion fuel cycles are penalized by high fissile inventories but promoted by low net consumption of fissile material as well as by low specific reprocessing expenditures.

30736 General features of advanced pressurized water reactors with improved fuel utilization. Oldekop, W.; Berger, H.D.; Zeggel, W. (Technical University of Braunschweig Institute for Spaceflight Engineering and Reactor Technology Pockelsstrasse 14, Postfach der TU: 3329, 3300 Braunschweig). *Nuclear Technology;* **59**: No. 2, 212-227(Nov 1982).

The main feature of an advanced pressurized water reactor (APWR) with improved fuel utilization is a plutonium-enriched tight lattice core integrated in an unchanged primary system of a common pressurized water reactor (PWR) power station. Neutron physical investigations demonstrate that conversion ratios in excess of 0.9 and final burnups of about 45,000 MWd/tHM are obtained with a reload enrichment of 7.5% fissile plutonium. The moderator-void coefficient is calculated to be negative. The high pressure drop of an APWR core is compensated for by a slightly reduced coolant flow rate. Despite the fact that calculated safety parameters such as void coefficient, critical heat flux margin, and emergency core cooling behavior have to be proven by experiments, the homogeneous concept of a high-converting PWR appears to be feasible.

30737 A note on estimation of pressure sensor time constant from the normal operating data. Wu, S.M.; Ouyang, M.S. (University of Wisconsin-Madison, Mechanical Engineering Department Madison, Wisconsin 53706). *Nuclear Science and Engineering;* **81**: No. 2, 298-299(Jun 1982).

A set of pressure data recorded from the primary coolant system of a pressurized water reactor under normal operation is examined. For pressure sensors under study, it is found that the range of sampling intervals adequate to abstract pressure dynamics is about 0.2 to 0.8 ms. The estimated time constant of the pressure sensor for operating data is 1.83 ms.

30738 KINE--A one-dimensional dynamics program for pressurized water reactors with partial boiling in the core. Fiebig, R.; Kruger, A. (GKSS Forschungszentrum Geesthacht GmbH, Postfach 1160 2054 Geesthacht). *Nuclear Science and Engineering;* **81**: No. 2, 291-298(Jun 1982).

A short description of the reactor dynamics program KINE is given. The KINE code is a onedimensional code solving the time-dependent neutron diffusion equations in a two-group representation, taking into account six groups of delayed neutron precursors, one heating channel composed of fuel, canning, and a coolant region in which boiling may occur. Special attention is given to radial averaging of coolant density and fuel temperature in a core in which partial boiling can exist. The method of solution is a modified backward extrapolation procedure. Stationary starting conditions are achieved by adjustment of control rod position or liquid poison concentration.

30739 Cost and other effects of reduced fuel pellet diameters. Dixon, D.J.; Elmaghrabi, M.A.; Rickard, I.C. (Combustion Engineering, Inc. 1000 Prospect Hill Road, Windsor, Connecticut 06002). *Nuclear Technology;* **57**: No. 2, 228-233(May 1982).

With the everchanging economic and licensing environment of the nuclear fuel cycle, Combustion Engineering (C-E) considered reducing the fuel pellet diameter of its current fuel rod designs. However, the economic incentive to reduce the diameter, considering the uncertainty of the assumptions used for the economics analysis, is at best very small. This together with the negative aspects of reduced safety margins, the increased number of discharge fuel assemblies that have to be stored or disposed of each year, and the change from a design of proven reliability all yield the conclusion that the current fuel pellet diameters used by C-E should not be changed. The conclusion differs from that reported by others as a result of the use of more sophisticated neutronics calculations and more realistic definition of fuel cycle cost parameters. This analysis was performed using C-E's most advanced neutronics model, DIT. The model was applied to high burnup fuel (48 MWd/kgU) and cores operating on 18-month cycles. To maintain constant batch average discharge burnup and constant energy production, the number of assemblies in each reload batch was increased as the fuel pellet radius decreased. Finally, the fabrication and disposal price was adjusted as the assembly loading decreased such that the cost to fabricate or dispose of each assembly was kept constant.

30740 Experimental modeling of hydrogen evolution rates from surfaces with exposed aluminum in contact with containment sprays in pressurized water reactor nuclear power plants. Smith, L.E.; Guthrie, P.V.; Lane, R.O. (Tennessee Valley Authority, Singleton Materials Engineering Laboratory Knoxville, Tennessee 37902). *Nuclear Technology;* **57**: No. 2, 175-178(May 1982).

Containment spray solutions recommended for application by the Tennessee Valley Authority contain boric acid buffered with either sodium hydroxide or trisodium phosphate. These solutions react with aluminum to produce aluminum compounds and gaseous hydrogen. Rates of hydrogen evolution from aluminum surfaces immersed in spray solution containing boric acid and sodium hydroxide (pH = 9.8) and solution containing boric acid, hydrazine, and trisodium phosphate (pH = 7.5) can be correlated within experi-

mental error, respectively, by the equations: $\log_{10}R = -3.4 \times 10^3T^{-1} + 9.2$ and $\log_{10}R = -4.2 \times 10^3T^{-1} + 10.2$. Significant reduction in hydrogen evolution rate is obtained if the sodium hydroxide buffered solution is modified by the addition of sodium silicate. Correlating equations for the modified solutions are, respectively: $\log_{10}R = -1.9(10^3)T^{-1} + 2.0$ and $\log_{10}R = -3.9(10^3)T^{-1} + 9.5$.

30741 **High temperature postirradiation materials performance of spent pressurized water reactor fuel rods under dry storage conditions.** Einziger, R.E.; Atkin, S.D.; Pasupathi, V.; Stellrecht, D.E. (Hanford Engineering Development Laboratory, P.O. Box 1970 Mail Stop W/A-53, Richland, Washington 99352). *Nuclear Technology;* **57**: No. 1, 65-80(Apr 1982).

Postirradiation studies on failure mechanisms of well-characterized pressurized water reactor rods were conducted for up to a year at 482, 510, and 571°C in limited air and inert gas atmospheres. No cladding breaches occurred even though the tests operated many orders of magnitude longer in time than the lifetime predicted by Blackburn's analyses. The extended lifetime is due to significant creep strain of the Zircaloy cladding, which decreases the internal rod pressure. The cladding creep also contributes to radial cracks, through the external oxide and internal fuel-cladding chemical interaction layers, which propagated into and arrested in an oxygen stabilized alpha-Zircaloy layer. There were no signs of either additional cladding hydriding, stress corrosion cracking, or fuel pellet degradation. If irradiation hardening does not reduce the stress rupture properties of Zircaloy, a conservative maximum storage temperature of 400°C based on a stress-rupture mechanism is recommended to ensure a 1000-yr cladding lifetime.

30742 **Power estimation in the pressurized water reactor.** Griffith, J.M. (EG & G Idaho, Inc., P.O. Box 1625, Idaho Falls, Idaho 83415). *Nuclear Technology;* **56**: No. 3, 447-453(Mar 1982).

The operation of a pressurized water reactor requires an estimate of average core power. If there is uncertainty in the power estimate, the plant must be operated at a reduced power level to ensure that safety-related indexes are not exceeded. Thus, power estimate uncertainty results in decreased energy production. A Kalman filter has been designed to combine information from several sources and thereby reduce power estimation errors. The investigation provides three primary results. First, clearly defined instrument-error models are specified and the need for these models becomes clear. Second, the investigation shows that the sensitivity to unexpected errors can be reduced by utilizing information from more than one source. Third, calculations for a hypothetical 1000-MW(electric) power plant that sells electrical energy for $0.06/kWh show that an additional annual revenue of approximately $1 million can be realized by applying the Kalman filter. A few calculations are the only investment needed to obtain the additional revenue.

30743 **An evaluation of pressurized water reactor frequent refueling.** Greacen, J.S.; Bernstein, I.; Matzie, R.A.; Miller D.D. (Combustion Engineering, Inc. 1000 Prospect Hill Road, Windsor, CT 06095). *Nuclear Technology;* **56**: No. 3, 516-526(Mar 1982).

Semiannual refueling was evaluated as an alternative to the current annual refueling interval for pressurized water reactors. A reference refueling shutdown schedule was established and, by reviewing critical path outage tasks, a minimum duration refueling-only outage was postulated. An improved refueling system consisting of two cantilever-mounted refueling machines and two fuel transfer systems was developed, and an advanced fuel management scheme was examined that reduced the amount of fuel shuffled. In addition, an economic evaluation was performed to determine breakeven energy costs.

30744 **Time-optimal control of spatial xenon oscillations to a generalized target.** Schulz, E.J.; Lee, J.C. (The University of Michigan, Department of Nuclear Engineering Ann Arbor, Michigan 48109). *Nuclear Science and Engineering;* **73**: No. 2, 140-152(Feb 1980).

Time-optimal control of axial xenon oscillations in pressurized water reactors is investigated in the present study, properly accounting for operating constraints on the allowable axial offset (AO) band. The system equation describing the spatial xenon oscillations has been reformulated using a lambda mode expansion in a form that readily allows a physical interpretation of the state vector and the system equation. In particular, AO measurements can be used to define the entire system parameters completely. Previous optimal control studies have been limited to the case of controls to the origin in the xenon-iodine phase plane. Our present investigation indicates that time-optimal controls should, in general, involve bang-bang controls to a line segment in this phase plane, subject to a band constraint on allowable AO or available control strength. A suboptimal control strategy, which can be applied directly in actual operating conditions without the aid of on-line computers, is also proposed. Verification of the proposed time-optimal control strategies is performed through computer simulations of xenon-induced transients.

2103 Power Reactors, Non-breeding, Graphite Moderated

30745 **(GA-A—17469) Remote examination of Fort St. Vrain HTGR fuel and reflector elements.** McCord, F.; Saurwein, J.J. (GA Technologies, Inc., San Diego, CA (USA)). 1984. Contract AT03-84SF11962. 15p. (CONF-840614—55). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012180.

From Annual meeting of the American Nuclear Society; New Orleans, LA, USA (3 Jun 1984).

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A robotic device developed at GA Technologies was used to perform remote metrological and visual examinations on 105 irradiated fuel and reflector elements removed from the High Temperature Gas Cooled Reactor (HTGR) core of the Fort St. Vrain (FSV) Nuclear Generating Station. All examinations were accomplished in a fraction of the time and at a fraction of the cost for manual methods. Theses examinations have been useful in the verification of core design codes, in monitoring the in-pile performance of graphite blocks, and in qualifying improved core materials.

30746 **Fission product Pd-SiC interaction in irradiated coated-particle fuels.** Tiegs, T.N. (Oak Ridge National Laboratory Metals and Ceramics Division, Oak Ridge, Tennessee 37830). *Nuclear Technology;* **57**: No. 3, 389-398(Jun 1982).

Corrosion and fission product release from silicon carbide (SiC)-coated high-temperature gas-cooled reactor fuel particles represent a serious problem. The SiC corrosion by fission product palladium has been observed. The current results show that temperature is the major factor affecting the corrosion rate of SiC by palladium. All other factorssuch as kernel composition, palladium concentration, other fission products, and SiC properties-are secondary.

30747 **Measurement of thermal power density distributions by fuel pin gamma scanning.** Dawson, J.T.; Smith, G. (Central Electricity Generating Board Berkeley Nuclear Laboratories, Berkeley, Gloucestershire). *Nuclear Technology;* **57**: No. 1, 125-133(Apr 1982).

The Central Electricity Generating Board carries out routine high resolution gamma scanning measurements on fuel discharged from civil advanced gas cooled reactors in its postirradiation facility at the Atomic Energy Establishment, Winfrith. The measurements yield thermal power density distributions within fuel channels to accuracies of within + or - 2%, which are used to check the corresponding theoretical predictions and assist the interpretation of postirradiation data. The high precision is achieved by careful attention to detail in both the measurement of fission product count rates and the subsequent analysis, and is demonstrated by internal consistency checks and comparisons with results of independent methods.

30748 **Synthetic fuel production using Texas lignite and a very high temperature reactor for process heat.** Ross, M.A.; Klein, D.E. (The University of Texas at Austin, Nuclear Engineering Program Austin, Texas 78712). *Nuclear Technology;* **56**: No. 3, 454-464(Mar 1982).

Two approaches for synthetic fuel production from coal are studied using Texas lignite as the feedstock. First, the gasification and liquefaction of coal are accomplished using Lurgi gasifiers and Fischer-Tropsch synthesis. A 50 000 barrel/day facility, consuming 13.7 million tonne/yr (15.1 million ton/yr) of lignite, is considered. Second, a nuclear-assisted coal conversion approach is studied using a very high temperature gas-cooled reactor with a modified Lurgi gasifier and Fischer-Tropsch synthesis. The nuclear-assisted approach resulted in a 35% reduction in coal consumption. In addition, process steam consumption was reduced by one-half and the oxygen plants were eliminated in the nuclear assisted process. Both approaches resulted in a synthetic oil price higher than the March 1980 imported price of $29.65 per barrel: $36.15 for the lignite-only process and $35.16 for the nuclear-assisted process. No tax advantage was assumed for either process and the utility financing method was used for both economic calculations.

30749 **Estimate of cross flow in high temperature gas-cooled reactor fuel blocks.** Groehn, H.G. (Kernforschungsanlage Julich GmbH Institut fur Reaktorbauelemente, Postfach 1913 D-5170 Julich). *Nuclear Technology;* **56**: No. 2, 392-400(Feb 1982).

The effect of cross flow on the main coolant flow was studied at a two block test section on the model scale of 1:1. The cross flow was introduced through a wedge-shaped gap located between the two succeeding fuel blocks mentioned. The gap width varied from 1.85 to 6 mm. The entrance area for the cross flow was modified by the arrangement of blocking pieces around the circumference of the gap. The velocity distribution over the cross section of the fuel blocks and the pressure loss over the gap were measured. The experimental results allow the prediction of the flow reduction in each coolant channel of the fuel block depending on the transverse pressure gradient driving the cross flow.

30750 **Measurements and calculations of the fuel temperature coefficient of reactivity for the Hinkley Point 'B' advanced gas-cooled reactor.** Richard, A.; Telford, R. (Central Electricity Generating Board, Research Division Berkeley Nuclear Laboratories, Berkeley, Gloucestershire GL13 9PB). *Nuclear Technology;* **56**: No. 1, 33-39(Jan 1982).

Tests have been carried out on one of the advanced gas-cooled reactors (AGRs) at Hinkley Point to determine the fuel temperature coefficient of reactivity, an important safety-related parameter. Reactor neutron flux was measured during transients induced by movement of a bank of control rods from one steady position to another. An inverse kinetics analysis was applied to the recorded flux transient to determine the reactivity change as the fuel temperature changed, and the variation of mean fuel temperature was derived from the flux transient by a multiplane thermal-hydraulics code representing an AGR fuel channel. The fuel temperature coefficient was then obtained from the slope of a plot of core reactivity against fuel temperature. The uncertainty to be applied to the derived temperature coefficient has been shown to be approximately + or - 10% at the one standard deviation level. The experimental technique has been found to be simple to apply on a commericial reactor and has given consistent results over a range of reactor operating conditions. Calculations of fuel temperature coefficients of reactivity (based on the lattice code, ARGOSY) have been carried out and reactor averaged values deduced for comparison with experiment. The calculated and measured coefficients agree to within one standard deviation over a range of core irradiations and power levels.

30751 **Prospects for non-electric application of high temperature reactors.** Kyger, J.A. (Argonne National Laboratory, Argonne, Illinois). *Alternative Energy Sources;* **5**: 23-29(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

This paper has a somewhat different background than most. It does not represent a summary of work I or Argonne National Laboratory has been doing nor an in-depth review of the subject as a whole. Rather it takes an objective look at work others have done and tries a fresh assessment of numerous approaches which have been suggested. There are perhaps two thoughts behind this effort. First and foremost is the simple recognition of the absolute need to eliminate dependence on unreliable and diminishing supplies of oil. Second is a more ephemeral consideration. It is based on the conviction that nuclear (fission) energy has more to offer than is currently being realized, and that the arguments against nuclear power are largely specious but have been cast into a "mindset" (a Kemeny Commission word) that makes nuclear electricity unpopular and causes electric utilities to turn away. Looking at nuclear energy from a fresh, non-electric vantage point just might finesse some of the obstacles. Combining these thoughts with a first level systems study has resulted in the following assessment.

30752 **Neutron streaming in pebble beds.** Leiberoth, J.; Stojadinovic, A. (INTERATOM, Internationale Atomreaktorbau GmbH Abteilung Neutronenphysik, Postfach D-5060 Bergisch Gladbach). *Nuclear Science and Engineering;* **76**: No. 3, 336-344(Dec 1980).

The fuel spheres in the core of a pebble-bed reactor are mainly distributed statistically. Regular configurations appear only near the walls and on the bottom of the core. A statistical distribution has been studied by means of a proper mock up. For this purpose the coordinates of 3024 sphere centers were defined by measurements so that Monte Carlo games for neutron diffusion could be established. From these results as well as from Monte Carlo calculations for the cubic and tetrahedral sphere configurations, the diffusion constants and the first two mean moments h^- and h^{2-} of the passage lengths in the holes were determined. Under the assumption that no correlation exists between the passage lengths in the holes and in the balls, an exact formula for the diffusion lengths was derived using $h^{2-}/(h)^{2-}$.

30753 **Resonance absorption in high-temperature gas-cooled reactor fuel with double heterogeneity.** Tsuchihashi, K.; Ishiguro, Y.; Kaneko, K. (Japan Atomic Energy Research Institute Division of Nuclear Reactor Engineering Tokai-mura, Ibaraki-ken,). *Nuclear Science and Engineering;* **73**: No. 2, 164-173(Feb 1980).

A simplified method based on the intermediate resonance approximation is proposed to deal with the double heterogeneity encountered in design calculations of high-temperature gas-cooled reactors. First, a fuel rod with grain structure is homogenized by introducing an equivalent homogeneous material, in the form of an intermediate resonance approximation, that contains a fictitious moderator substituted for both the grain heterogeneity and the scattering in moderator region. Second, the cluster configuration of the homogenized rods is treated by use of the fictitious moderator. This method is shown to offer a convenient and simple means with good accuracy and short computing time when combined with the "table look-up" method of resonance shielding factors.

2104 Power Reactors, Non-breeding, Otherwise Moderated Or Unmoderated

REFER ALSO TO CITATION(S) 30794, 30823, 30829, 30840, 30938

30754 **(AECL—7681) High-speed data acquisition system to measure low-level current from self-powered flux detectors in CANDU nuclear reactors.** Lawrence, C.B.; Hall, D.S. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). May 1982. 10p. (CONF-8205254—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701870.

From Canadian conference on industrial computers; Hamilton, Ontario, Canada (3 May 1982).

Self-powered flux detectors are used in CANDU nuclear power reactors to determine the spatial neutron flux distribution in the reactor core for use by both the reactor control and safety systems. To establish the dynamic response of different types of flux detectors, the Chalk River Nuclear Laboratories have an ongoing experimental irradiation program in the NRU research reactor for which a data acquistion system has been developed. The system described in this paper is used to measure the currents from the detectors both at a slow, regular logging interval, and at a rapid, adaptive rate following a reactor shutdown. Currents that range from 100 pA to 1 mA full scale can be measured from up to 38 detectors and stored at sampling rates of up to 20 samples per second. The

dynamic characteristics of the detectors can be computed from the stored records. The data acquisition system comprises a DEC LSI-11/23 microcomputer, dual cartridge disks, floppy disks, a hard copy and a video display terminal. The RT-11 operating system is used and all application programs are written in FORTRAN.

30755 (EPRI-NP—3402-SR, pp 2.1-2.19) **Experience of continuos isokinetic sampling on the Winfrith Reactor.** Bird, E.J. (United Kingdom Atomic Energy Authority, Winfrith, England). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Since the Winfrith reactor used a direct cycle system and was a UK prototype it was essential to obtain the best possible information relating to particulate as well as soluble corrosion product release and transport in the various water circuits. A decision was made during the latter years of reactor construction to provide isokinetic sampling (IKS) facilities as part of the initial equipment despite limited experience with it elsewhere. Conventional small bore (6 to 10mm) sampling lines were also retained but these quickly fell into disuse. This paper considers experience and the usefulness of IKS at the Winfrith reactor over 14 years of operation since 1968.

30756 (INIS-mf—8966, pp vp) **CANDU operating experience.** McConnell, L.G.; Woodhead, L.W.; Fanjoy, G.R. (Ontario Hydro, Toronto (Canada)). 1982. NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780360. (CONF-8204158—).

From Nuclear information seminar; Calgary, Alberta, Canada (7 Apr 1982).

The CANDU Pressurized Heavy Water (CANDU-PHW) type of nuclear-electric generating station has been developed jointly by Atomic Energy of Canada Limited and Ontario Hydro. This paper highlights Ontario Hydro's operating experience using the CANDU-PHW system, with a focus on the operating performance and costs, reliability of system components and nuclear safety considerations both to the workers and the public.

30757 (INIS-mf—8966, pp vp) **Economics of coal-fired and nuclear power generation in Alberta.** Foulkes, F.M. (Canatom Ltd., Montreal, Quebec (Canada)). 1982. NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780360. (CONF-8204158—).

From Nuclear information seminar; Calgary, Alberta, Canada (7 Apr 1982).

Results are presented of a comparative study of capital and operating costs of hypothetical nuclear-generating stations and coal-fired plants in Alberta commissioned in 1990 and 2000. Two 600 MW (net) standard CANDU units were compared with three 375 MW (net) fossil-fired units, typical of existing units in service in Alberta.

30758 (OH—82-37-K) **Review of current knowledge on the effects of hydrogen on the pressure tubes of Ontario Hydro operating reactors.** Leger, M. (Ontario Hydro Research Lab., Toronto (Canada)). 2 Mar 1982. 46p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701876.

Since the occurrence of cracking in Zr-2.5 wt% Nb pressure tubes in Pickering 'A' units 3 and 4 in 1974/75 a great deal of information on the behaviour of hydrogen in pressure tube materials has been generated through research effort by both AECL and Ontario Hydro. In order to use this information effectively and to provide direction and co-ordination for ongoing research, a review of available information and current concerns on hydrogen in pressure tubes was undertaken. The review was divided into two main areas of interest: hydrogen ingress and hydride effects. The uncertainties in the rates of hydrogen ingress into the pressure tubes have been found to be very large. On the basis of current knowledge, predictions of the future behaviour of pressure tubes due to hydride effects are extremely difficult.

30759 **CANDU-PHW pressure tubes: Their manufacture, inspection, and properties.** Cheadle, B.A.; Coleman, C.E.; Licht, H. (Atomic Energy of Canada Limited, Chalk River Nuclear Laboratories Metallurgical Engineering Branch, Chalk River, Ontario KOJ 1JO). *Nuclear Technology;* **57**: No. 3, 413-425(Jun 1982).

Cold-worked Zr-2.5 wt% Nb pressure tubes for Canada Deuterium Uranium Pressurized Heavy Water Reactors are made by hot extruding hollow billets into tubes that are cold-worked to size and to develop their tensile strength. All manufacturing steps are closely controlled, and the tubes meet very stringent specifications. To ensure that the tubes are free of unacceptable defects, the ingots, billets, and finished tubes are ultrasonically inspected. The strength and flaw tolerance of the tubes have been measured. Tubes removed from both research and operating power reactors have been examined to measure changes in each of these properties due to the effects of reactor operaton. All tests show that cold-worked Zr-2.5 wt% Nb pressure tubes have excellent tensile strength and resistance to failure.

30760 **Multidimensional space-time kinetics of a heavy water moderated nuclear reactor.** Winn, W.G.; Baumann, N.P.; Jewell, C.E. (E.I. du Pont de Nemours and Company Savannah River Laboratory, Aiken, South Carolina 29801). *Nuclear Science and Engineering;* **73**: No. 3, 294-300(Mar 1980).

Diffusion theory analysis of a series of multidimensional space-time experiments is appraised in terms of the final experiment of the series. In particular, TRIMHX diffusion calculations were examined for an experiment involving free-fall insertion of a ^{235}U-bearing rod into a heavy water moderated reactor with a large reflector. The experimental transient flux-tilts were accurately reproduced after cross section adjustments forced agreement between static diffusion calculations and static reactor measurements. The time-dependent features were particularly well modeled, and the bulk of the small discrepancies in space-dependent features should be removable by more refined cross-section adjustments. This experiment concludes a series of space-time experiments that span a wide range of delayed neutron holdback effects. TRIMHX calculations of these experiments demonstrate the accuracy of the modeling employed in the code.

2105 Power Reactors, Breeding

REFER ALSO TO CITATION(S) 30711, 30747, 30855, 30860, 30862, 30958, 30959, 30964, 30965, 30966, 30967, 30968, 30969

30761 **(ANL—82-64) DIF3D: a code to solve one-, two-, and three-dimensional finite-difference diffusion theory problems.** Derstine, K.L. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 292p. NTIS, PC A13/MF A01; 1; GPO Dep. Order Number DE84012678.

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The mathematical development and numerical solution of the finite-difference equations are summarized. The report provides a guide for user application and details the programming structure of DIF3D. Guidelines are included for implementing the DIF3D export package on several large scale computers. Optimized iteration methods for the solution of large-scale fast-reactor finite-difference diffusion theory calculations are presented, along with their theoretical basis. The computational and data management considerations that went into their formulation are discussed. The methods utilized include a variant of the Chebyshev acceleration technique applied to the outer fission source iterations and an optimized block successive overrelaxation method for the within-group iterations. A nodal solution option intended for analysis of LMFBR designs in two- and three-dimensional hexagonal geometries is incorporated in the DIF3D package and is documented in a companion report, ANL-83-1.

30762 **(CONF-840570—7) U.S. fast reactor materials and structures program.** Harms, W.O.; Purdy, C.M. (Oak Ridge National Lab., TN (USA); Department of Energy, Washington, DC (USA)). 1984. Contract AC05-84OR21400. 11p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012330.

From Materials for future energy systems conference; Washington, DC, USA (1 May 1984).

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The U.S. DOE has sponsored a vigorous breeder reactor materials and structures program for 15 years. Important contributions have resulted from this effort in the areas of design (inelastic rules, verified methods, seismic criteria, mechanical properties data); resolution of licensing issues (technical witnessing, confirmatory testing); construction (fabrication/welding procedures, nondestructive testing techniques); and operation (sodium purification, instrumentation and chemical analysis, radioactivity control, and in-service inspection. The national LMFBR program currently is being restructured. The Materials and Structures Program will focus its efforts in the following areas: (1) removal of anticipated licensing impediments through confirmation of the adequacy of structural design methods and criteria for components containing welds and geometric discontinuities, the generation of mechanical properties for stainless steel castings and weldments, and the evaluation of irradiation effects; (2) qualification of modified 9 Cr-1 Mo steel and tribological coatings for design flexibility; (3) development of improved inelastic design guidelines and procedures; (4) reform of design codes and standards and engineering practices, leading to simpler, less conservative rules and to simplified design analysis methods; and (5) incorporation of information from foreign program.

30763 **(EGG-M—13383) Design and operation of a rapid thermal transient component testing sodium loop.** Crandall, D.L. (EG and G Idaho, Inc., Idaho Falls (USA)). 16 Apr 1984. Contract AC07-76ID01570. 7p. (CONF-840411—22). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012768.

From 3. meeting on liquid metal in energy applications; Oxford, UK (9 Apr 1984).

A specific problem developed during the design of an on-line sampling system for the Sodium Loop Safety Facility fast breeder reactor experiments. Rapid fluctuations in the sodium temperature, caused by reactor operation and shutdown, exposed the system components to conditions that could result in fatigue failure. A component test loop was designed and built at the Idaho National Engineering Laboratory to allow experimental qualification of component integrity. This paper outlines test system requirements, describes the design and special features, presents test procedures ad relates significant operating experience.

30764 **(EGG-M—13583) Diffusion bonding resistant valve development for sodium service.** Crandall, D.L.; Low, J.O.; Chung, D.T.; Loop, R.B. (EG and G Idaho, Inc., Idaho Falls (USA)). 16 Apr 1984. Contract AC07-76ID01570. 8p. (CONF-840411—21). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012769.

From 3. meeting on liquid metal in energy applications; Oxford, UK (9 Apr 1984).

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Unanticipated functional failures occurred in valves undergoing containment integrity testing for liquid sodium service. The failures resulted from diffusion bonding of the Stellite 6B valve plug to the Type 316 stainless steel (SS) seat. As a result of these failures, a valve development program was undertaken. A modified valve incorporating a Tribaloy 800 plug showed significant improvement in resistance to diffusion bonding but still failed after long term exposure in a closed position. A second modified valve using Tribaloy 800 in both the valve plug and seat successfully resisted diffusion bonding failure. This paper reports the details of the testing and posttest valve examinations. The results of scanning electron microscopy, dispersive x-ray spectrometry, and metallography provide the characteristics of the valve failures. Limitations of the various valve designs are also discussed.

30765 **(HEDL-SA—3054-FP) Donor flow formulation for momentum flux differencing.** Padilla, A. Jr.; Rowe, D.S. (Hanford Engineering Development Lab., Richland, WA (USA)). 14 Mar 1984. Contract AC06-76FF02170. 11p. (CONF-840614—54). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012416.

From Annual meeting of the American Nuclear Society; New Orleans, LA, USA (3 Jun 1984).

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A new donor flow formulation for momentum flux differencing has been developed to eliminate the pressure and velocity anomalies caused by fictitious momentum sources that arise when other numerical formulations are used to characterize the large density gradients associated with sodium boiling. This new formulation has been incorporated into the CAPRICORN subchannel code for sodium boiling in fuel bundles, resulting in considerable improvement in numerical performance.

30766 **(INIS-mf—8965) Dounreay.** (UKAEA Dounreay Nuclear Power Development Establishment). 1982. 34p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780287.

A folder encloses illustrated booklets dealing with: (a) the Prototype Fast Reactor (PFR); and (b) PFR fuel reprocessing. The former covers: historical introduction; basis of design; design and site layout; primary circuit; fuel and core structure; heat removal and steam plant; fuel handling; instrumentation; control; PFR performance; experimental facilities. The latter covers: the PFR fuel cycle; background; irradiation (burning) of fuel; reprocessing; waste management. The folder itself carries illustrated accounts of:the need for fast reactors; the work of Dounreay; safety; general information about Dounreay. (U.K.).

30767 **(KFKI—1983-60) Theoretical analysis of hydrogen concentration distribution and acoustic field in Na-water steam generator in presence of micro-leak.** Kozma, R.; Katona, T. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Jun 1983. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701729.

The theoretical foundations of hydrogen concentration distribution and the acoustic field in a Na-water steam generator in the presence of micro-leaks are considered. It is shown that both problems lead to the solution of the same boundary value problem for the two-dimensional Helmholtz equation. For the solution of the Helmholtz equation the multiple scattering method is applied. The application of the presented theory in the practice is discussed.

30768 **(UJV—6485-T) Flowrate and wall shear stress distribution calculation in the side and corner areas of BN-600-type fuel subassembly in the laminar approach.** Schmid, J. (Ustav Jaderneho Vyzkumu, Rez (Czechoslovakia)). 1983. 27p. (In Russian). Nuclear Research Inst., Rez, Czechoslovakia. Order Number TI84901341.

Results of finite element calculations of laminar flowrate distribution in the side and corner areas of BN-600-type fuel subassembly are presented together with the results of calculations of wall shear stress distribution along the surfaces of cladding, wrapper tube, and filling wire. This work is closely connected with the experimental program of measurement of local hydrodynamical characteristics of turbulent flow on HEM-2 test facility. This test facility represents an enlarged peripheral region of the BN-600-type fuel subassembly.

30769 **Electrical power distribution system for Clinch River Breeder Reactor Plant.** Rebbapragada, R.V.; Jain, K.R. (Burns & Roe, Inc. 700 Kinderkamack Road Oradell, New Jersey 07649). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 879-890(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

This paper describes the auxiliary electric power system for the Clinch River Breeder Reactor Plant (CRBRP). The power systems covered are the utility grid interconnections, plant power

supply systems medium and low voltage AC systems, 125/250V DC system, 120V vital AC system, and safety related AC distribution system. The paper also describes the mode of connection of non-Class 1E loads to Class 1E power systems, and a cross-connect feature between Division 1 and Division 2 Class 1E AC power systems.

30770 **Results from an international intercomparison of fundamental mode benchmark calculations for steam ingress into gas-cooled fast reactor cores.** Kiefhaber, E. (Kernforschungszentrum Karlsruhe Institut fur Neutronenphysik und Reaktortechnik Postfach 3640, D-7500 Karlsruhe 1). *Nuclear Technology;* **59**: No. 3, 483-493(Dec 1982).

Steam ingress into a gas-cooled fast reactor (GCFR) core may lead to reactivity effects that are undesirable from the point of view of reactor safety. Unfortunately, the amount of reactivity increase caused by a certain steam concentration is usually subject to considerable uncertainty, as has become evident by occasional comparisons between various laboratories for specific examples. Therefore, some time ago, a series of intentionally simple benchmarks were proposed in order to study in a systematic way the calculational uncertainty of the steam ingress reactivity arising essentially from differences in the nuclear data basis used at various laboratories. The analysis of corresponding results provided by laboratories in France, Germany, Japan, Switzerland, and the United States reveals that there still exist appreciable deviations in the predicted steam ingress reactivity effect. Due to the extensive cancellation of positive and negative contributions to this reactivity effect, the resulting net value is extremely sensitive to deviations in the nuclear data and calculational methods. Typical discrepancies for the calculated steam ingress reactivity observed within the framework of an international intercomparison are described, leading to the conclusion that further improvements in the nuclear data basis are desirable and the development and application of fairly refined calculational methods is mandatory to be able to predict the corresponding effect with sufficient reliability for related power reactor designs. In addition, measurements of equivalent reactivity effects should be continued in different critical assemblies to provide a broader experimental basis for the verification of the calculational tools.

30771 **Boiling and dryout predictions in postaccident heat removal situations.** Benocci, C.; Buchlin, J.M.; Joly, C. (von Karman Institute for Fluid Dynamics, Chaussee de Waterloo, 72 B-1640 Rhode Saint Genese). *Nuclear Technology;* **59**: No. 2, 234-237(Nov 1982).

A new model is proposed to predict the formation and influence of channels on the behavior of the debris bed related to the postaccident heat removal situation in fast breeder nuclear reactors cooled by liquid sodium. A two-dimensional dryout numerical prediction based on the spouting occurrence shows a complete agreement with the results of in-pile tests D2, D3, and D4 at Sandia National Laboratories.

30772 **Modeling of carbide fuel rods.** Preusser, T. (Institute of Reactor Technology Technical University Darmstadt, Petersenstrasse 30 D-6100 Darmstadt). *Nuclear Technology;* **57**: No. 3, 343-371(Jun 1982).

For a number of reasons, over the past ten years, much interest has been shown in developing the concept of advanced fuel in liquid-metal fast breeder reactors alongside the classical oxide fuel rod. To describe those concepts theoretically, the integral fuel rod code URANUS was extended to include a carbide fuel version. All the relevant material propertiesthermal, mechanical, and irradiation-induced-for UC and (U,Pu)C were taken into account. Material data were extracted from published literature and after careful comparison were assessed and correlated. The models for solid body and gas bubble swelling and for fission gas release are newly developed and calibrated to accessible data. Together with the standard routines of URANUS for calculating temperatures, geometry in hot state, stresses, strains, crack mechanics, plasticity, gap conductance and burnup, and with the axial coupling of individual sections, a detailed description is available for precalculation and interpretation of carbide rod experiments.

30773 **Materials development for fast breeder reactor cores.** Chin, B.A.; Neuhold, R.J.; Straalsund, J.L. (Auburn University Department of Mechanical Engineering, Auburn, Alabama 36849). *Nuclear Technology;* **57**: No. 3, 426-435(Jun 1982).

A nationally coordinated materials development program for fast breeder reactors is being conducted to improve the economy and reliability of replaceable core components. The program is comprised of three parallel paths, including reference alloys for present applications, second-generation alloys for near-term applications, and third-generation alloys for longer term applications. Reference alloy work is complete, with the major program emphasis being placed on qualification of titanium-modified Type 316 stainless steel (D9) for core applications. Ferritic alloy, HT-9, has been identified as an excellent duct material, and qualification of this alloy is being phased in as D9 work is completed. Another four alloys have been identified as potential cladding materials and are scheduled for completed development and application by 1988.

30774 **Flow measurement in sodium and water using pulsed-neutron activation: Part 2, experiment.** Price, C.C.; Curran, R.N.; Larson, H.L.; Sackett, J.I. (Argonne National Laboratory, P.O. Box 2528, Idaho Falls, Idaho 83401). *Nuclear Technology;* **57**: No. 2, 272-284(May 1982).

A measurement of water flow on the Experimental Breeder Reactor II (EBR-II) evaporator downcomers, a measurement of sodium flow on the EBR-II secondary sodium system, and a calibration experiment at the University of Utah Water Research Laboratory are three experiments using the pulsed neutron activation (PNA) technique to determine flow rate. The EBR-II data permit calculation of flow rates and comparisons with instrumentation and the Water Research Laboratory data permit investigation of different weighting schemes for determining the flow rates. The PNA technique is an accurate and convenient procedure that yields flow rates without accompanying system disturbance. Pipe size is not a factor except that corrections may be needed for asymmetry of larger pipes. Accuracy is adequate for most applications and indicates the PNA technique is most useful as a calibration device.

30775 **Flow measurement in sodium and water using pulsed-neutron activation: Part 1, theory.** Larson, H.A.; Curran, R.N.; Price, C.C.; Sackett, J.I. (Argonne National Laboratory, P.O. Box 2528, Idaho Falls, Idaho 83401). *Nuclear Technology;* **57**: No. 2, 264-271(May 1982).

A mathematical analysis and experimental averaging techniques are developed for flow measurements that use pulsed neutron activation. Experimental time-weighting procedures are evaluated for the two extremes of laminar and turbulent flow. In addition, criteria are developed that reflect expected error from an experimental procedure. Experimental data and confirmation of weighting techniques follow in a companion paper.

30776 **Mol-7B-an 18-pin bundle operating 200 days beyond breach.** Weimar, P.; Ernst, W. (Kernforschungszentrum Karlsruhe Institut fur Material- und Festkorperforschung III Postfach 3640, Weberstrasse 5, 7500 Karlsruhe Fed). *Nuclear Technology;* **57**: No. 1, 81-89(Apr 1982).

Until now, experience with the consequences of longer operation of failed mixed oxide fuel pins in liquid-metal fast breeder reactor has not been available. Mol-7B, an 18-pin bundle, was originally specified and fabricated to test the SNR-300-Mk-Ia concept under extreme operating conditions, especially with a cladding temperature of 973 K. Because of larger uncertainties of flux distribution in the BR-2 reactor in Mol, Belgium, this bundle was irradiated with a rod power that was 20% higher as expected. As a consequence, 17 of the 18 pins failed during the irradiation campaign. The main reason was mechanical interaction of the fuel with the embrittled and corroded cladding and excessive fission gas pressure. Cladding opening was followed by chemical reaction between sodium coolant and the fuel. A partial blockage occurred from the buildup of the reaction product Na_3MO_4 and from the diameter increase due to uranate swelling. In spite of these severe failures and large fuel release to the coolant, the bundle could be operated with a high nominal rod power without cladding melting and more severe consequences on bundle integrity and on reactor safety.

30777 Heat treatment of 2 1/4 Cr--1 Mo steel for breeder reactor steam generators. Klueh, R.L. (Oak Ridge National Laboratory Metals and Ceramics Division, P.O. Box X Oak Ridge, Tennessee 37830). *Nuclear Technology;* **57**: No. 1, 114-124(Apr 1982).

Commercially, 2 1/4 Cr--1 Mo steel is used in various heat-treated conditions. Present designs for breeder reactor steam generators call for the steel to be used in an annealed or isothermally annealed condition. Future reactor steam generators may offer an incentive to use a normalized-and-tempered steel. The elevated-temperature mechanical property differences between the normalized-and-tempered and annealed or isothermally annealed conditions were assessed to determine the advisability of using the normalized-and-tempered material for breeder reactor steam generators. The mechanical properties of 2 1/4 Cr--1 Mo steel are determined by the microstructure, which can be different for annealed and normalized-and-tempered steel. The extreme in microstructural difference is when the normalized-and-tempered steel is entirely bainite and the annealed steel is 75 to 80% proeutectoid ferrite, the balance bainite. Mechanical property data for annealed and normalized-and-tempered 2 1/4 Cr--1 Mo steel with these microstructures were compared. The results were analyzed in terms of the kinetics of the different metallurgical changes that the various microstructures undergo during an elevated-temperature test or elevated-temperature exposure during service. It was concluded that 2 1/4 Cr--1 Mo steel could be used in all heat treatments that are presently used in commercial practice.

30778 Fuel chemistry impact on vented fuel pin design. Blackburn, P.E.; Fee, D.C.; Johnson, C.E.; Tam, S.W. (Argonne National Laboratory, Chemical Engineering Division 9700 South Cass Avenue, Argonne, Illinois 60439). *Nuclear Technology;* **57**: No. 1, 104-113(Apr 1982).

Venting and pressure equalization of gas-cooled fast breeder reactor (GCFR) fuel rods can be maintained only as long as axial gas transport paths are available and operating within the fuel pin. Analysis of the chemistry expected within an irradiated GCFR fuel pin shows that axial gas transport paths may become plugged due to the migration of fission product cesium and the formation of low density cesium-urania or cesium-fuel compounds. Cesium transport in the fuel and blanket is controlled by oxygen concentrations and by temperature distribution. Analysis of the shorter Experimental Breeder Reactor II in-reactor fuel pins suggests cesium will be retained in the much longer fast test reactor pins. This will lead to minimal plugging of the gas transport paths.

30779 Combination of fuel-cladding chemical and mechanical interactions in mixed oxide fuel pins. Gotzmann, O. (Kernforschungszentrum Karlsruhe Institut fur Material- und Festkorperforschung, Postfach 3640 D-7500 Karlsruhe). *Nuclear Technology;* **57**: No. 1, 90-103(Apr 1982).

Encapsulated mixed oxide fuel pins were irradiated in the Belgian reactor BR-2 under epithermal flux conditions. Of 12 pins, 5 failed. Heavy cladding corrosion and significant cladding deformation was observed in postirradiation examination. The failures are attributed to a combined action of fuel-cladding mechanical and chemical interactions, for which favorable conditions existed in these tests.

30780 Metallic combinations of Pu-Th and ^{233}U-Th or Pu-Th and ^{233}U-^{233}U fuel cycles as possible alternatives to (Pu-U)0_2 in LMFBRS. Lee, C.C.; Karam, R.A. (Georgia Institute of Technology School of Nuclear Engineering, Atlanta, Georgia 30332). *Nuclear Technology;* **56**: No. 3, 535-546(Mar 1982).

Optimized breeding performances of three breeder strategies are compared. The first strategy is the normal mixed plutonium-uranium oxide fuel cycle, which is used as a reference case. The second is based on the use of the light water reactor generated plutonium in interim Pu-Th (metallic fuel) breeders cooled with sodium to build up ^{233}U inventory for use in liquid-metal fast breeder reactors fueled with metallic ^{233}U-Th. The third is based on a combination cycle involving two reactor types, Pu-Th and ^{233}U^{238}U, both using metallic fuel and sodium as a coolant. These reactors will operate simultaneously; the excess ^{233}U generated in the Pu-Th reactors is used to fuel the ^{233}U-^{238}U reactors and the plutonium generated in the ^{233}U-^{238}U reactors is used to fuel the Pu-Th reactors. The combination cycle has obvious antiproliferation characteristics. The breeding performance as measured by optimized compound system doubling time for nominal 1000-MW(electric) systems was 8.8 years for the combination system of Pu-Th and ^{233}U-^{238}U reactors, 31.4 years for the ^{233}U-Th reactor, and 14 years for the (Pu-U)O_2 reactor. The corresponding optimum fuel pin diameters were 0.30, 0.37, and 0.28 in., respectively. The $\Delta k/k$ change associated with the removal of all the sodium from the inner core (inner to outer core volume ratio is 60:40) was +0.03, +1.01, +1.23, and +2.60% for the ^{233}U-Th, ^{233}U-^{238}U, Pu-Th, and (Pu-U)O_2 reactors, respectively. Preliminary calculations indicate that it is possible to design the ^{233}U-^{238}U reactors to operate on an extended cycle such that once the reactor is built, it only needs natural uranium as feed fuel for the rest of the lifetime of the reactor. Estimates of the fuel cycle costs of each reactor show that the cost of the extended burnup cycle is about35% less than the (Pu-U)O_2 cycle.

30781 Optimization of a variable flow allocation scheme in heterogeneous liquid-metal fast breeder reactors. Tzanos, C.P. (Science Applications, Inc. 1211 W. 22nd Street, Oak Brook, Illinois 60521). *Nuclear Technology;* **55**: No. 3, 662-673(Dec 1981).

Maximum cladding temperatures in heterogeneous liquid-metal fast breeder reactors (LMFBRs) can be reduced if the flow allocation between core and blanket assemblies is continuously varied during burnup. An analytical model has been developed that optimizes the time variation of the flow such that the reduction in maximum cladding temperatures is maximized. In addition, the concept of continuously varying the flow allocation between core and blanket assemblies has been evaluated for different fuel management schemes in a low sodium void reactivity 3000-MW heterogeneous LMFBR. This evaluation shows that the reduction in maximum cladding midwall temperatures is small (about 10°C) if the reactor is partially refueled at the end of each burnup cycle (cycle length of one year), and this reduction is increased to 20°C if a straight burn fuel scheme is used with a core and internal blanket fuel residence time of two years.

30782 A fast reactor core concept using an internal blanket. Kawashima, K.; Inoue, K.; Kobayashi, S. (Energy Research Laboratory, Hitachi Ltd. 1168 Moriyama-cho, Hitachi, Ibaraki 316). *Nuclear Technology;* **55**: No. 3, 713-719(Dec 1981).

A new core concept using an internal blanket, which is one type of heterogeneous core, has been developed. The core employs a disk-shaped internal blanket at the axial central region of the core. This internal blanket extends radially all the way through the core to the external blanket and is arranged so that its thickness is greater in the radial inner core region than the outer core region. It is designated as a "hamburger" core concept. Neutronics calculations for the equilibrium burnup cycle of 2500-MW(thermal) oxide-fueled liquid-metal fast breeder reactors exhibit the following advantages for the hamburger core over the corresponding conventional two enrichment zone homogeneous one: Breeding gain (breeding ratio = 1.0) increases by 5 to 7%, and the reactor doubling time decreases by about 10%. Burnup reactivity depression is reduced by about 30%. Power peaking factor and the power swing of fuel assemblies during burnup are almost the same. Sodium void reactivity for the inner core region (including the internal blanket) is reduced by about 25%. Total fuel cycle cost is almost the same.

30783 Effective diffusion coefficients for low density cylindrical channels. Rowlands, J.L.; Eaton, C.R. (United Kingdom Atomic Energy Authority, Atomic Energy Establishment Winfrith, Dorchester, Dorset DT2 8DH). *Nuclear Science and Engineering;* **76**: No. 3, 263-281(Dec 1980).

Diffusion theory overestimates neutron transport in voided or low-density regions of a reactor when the diffusion coefficient is defined as 1/3Σ/SUB tr/. Alternative definitions of the diffusion coefficient for such regions have been proposed. The present paper summarizes some definitions of axial diffusion coefficient for cylindrical channels and proposes a modification to an earlier formula. The results of calculations for a channel in a fast reactor supercell

model using different formulas are compared and the limitations of this method, which involves changing only the channel diffusion coefficient, are discussed.

30784 **An evaluation of different methods for space-dependent resonance shielding of cross sections in fast reactors.** Rao, J.V.; Lee, S.M.; Sharma, M.L. (Reactor Research Centre, CDO 211, RRC Kalpakkam 603 102, Tamil Nadu). *Nuclear Science and Engineering;* **76**: No. 3, 351-356(Dec 1980).

Within the framework of the Abajan, Bazazjantz, Bondarenko, and Nikolaev (ABBN) shielding factor approach, several methods have been proposed in the past for the treatment of resonance shielding of multigroup cross sections in heterogeneous cells of fast reactor lattices. First, the approximations made in the different methods and their interrelationship is briefly reviewed. Then, three recent efficient methods proposed by Bitelli et al., by Tone, and by Kujawski and Protsik are numerically compared by checking against exact fine-group collision probability calculations. It is found that the method of Bitelli et al. may give erroneous results, while the methods of Tone and of Kujawski and Protsik show satisfactory agreement with the exact calculations.

30785 **Measurements of structural material capture to uranium-235 fission rate ratios in an intermediate spectrum assembly.** Azzoni, P.; Benzi, V.; Chiodi, P.L.; Giuliani, C.; Guardini, S.; Marrasi, R.; Salomoni, A.; Tassan, S. (Centro di Calcolo del Comitato Nazionale per l'Energia Nucleare Bologna). *Nuclear Science and Engineering;* **76**: No. 1, 70-77(Oct 1980).

Experimental determinations of capture rates of structural materials used in fast breeder reactors, such as iron, chromium, nickel, and stainless steel, normalized to the ^{235}U fission rate, were performed. The aim of these experiments was to check structural material multigroup cross-section libraries in the 1- to 100-keV range, where substantial discrepancies among various cross-section evaluations are not yet resolved. The experiments were carried out in an ARGONAUTtype RB-2 reactor, using the Null Reactivity Oscillation method, on test media composed of quasi-homogeneous loose particle mixtures. Comparisons were carried out with corresponding calculated values, showing a trend of these values to overestimate the measured quantities. These results are not in disagreement with the indications of recent ^{235}U cross-section measurements as far as the σ /SUB c/ /σ /SUB f/ of ^{235}U is concerned.

2106 Power Reactors, Auxiliary, Mobile, Package, And Transportable

REFER ALSO TO CITATION(S) 30877

2107 Regulation And Licensing

REFER ALSO TO CITATION(S) 30719, 30883, 31011

30786 **(INIS-mf—8619) Decree No. 82-918 of 26 October 1982 concerning the High Council for Nuclear Safety.** (French Government, Paris). 29 Oct 1982. 1p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780213.

Published in French Official Gazette No. 253.

This Decree lays down the composition of the High Council for Nuclear Safety which comprises representatives of parliament and of various ministries and scientific technical economic circles covering industry, energy, environment, defense, labour, as well as health and safety. (NEA).

30787 **(INIS-mf—8733) Control density of the administrative courts with regard to nuclear licensing.** Deppe, V. (Goettingen Univ. (Germany, F.R.). Juristischer Fachbereich). 2 Jul 1982. 163p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84780284.

A possibility does not exist to limit the extent of the activities of administrative courts with regard to the control of the nuclear license decision by a shifting of one part of the ultimate decision competence from the jurisdiction to the executive. The responsibility of the administrative courts which is established in the constitution gives them a comprehensive controlling function with regard to nuclear licensing. Their right of ultimate decision, which is established in the constitution, corresponds to a duty of ultimate decision, which is of paramount importance in such a fundamental law relevant area, as it is nuclear law. The legislator has to help the overburdened courts. The courts themselves are bound to their responsibility as it is laid down in the constitution and the Atomic Energy Act to guarantee legal protection so that any form of self-restraint is inadmissable.

30788 **(INIS-mf—8908) Decree No. 82-531 of 22 June 1982 on the Higher Council for Nuclear Safety.** (French Government, Paris). 24 Jun 1982. 1p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780214.

Published in the French Official Gazette No. 145.

This Decree lays down the composition of the Higher Council for Nuclear Safety which comprises representatives of parliament and of various ministries and scientific, technical, economic circles covering industry, energy, environment, defense, labour, as well as health and safety. (NEA).

30789 **(INIS-mf—8910) Decree No. 82-734 of 24 August 1982 amending Decree No. 70-878 of 29 September 1970 (as amended) and Decree No. 72-1158 of 14 February 1972 (as amended) concerning the Atomic Energy Commission.** (French Government, Paris). 26 Aug 1982. 2p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780215.

Published in the French Official Gazette No. 198.

The purpose of this Decree is to give the Atomic Energy Commission (CEA) wider duties and to modify the structure and certain responsabilities of its directing bodies. While the CEA's responsibilities under previous regulations are maintained in full, they have now been placed in a regional dimension in accordance with the principles set out in the Act of 15th july 1982 concerning orientation and planning of technological research and development in France. (NEA).

30790 **(INIS-mf—8931) Act No. 83-630 of 12 July 1983 concerning democratization of public enquiries and protection of the environment.** (French Government, Paris). 17 Jul 1983. 2p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780209.

Published in the French Official Gazette No. 161.

Henceforth separated from expropriation procedures, public enquiries have become compulsory for any plans, achievements or work likely to affect the environment because of their type, consistence or nature of the areas involved. Lists of operations subject to procedures, thresholds and technical criteria will be determined by decrees made in the Council of State. The purpose of the enquiry is to inform the public and obtain its suggestions. The enquiry is conducted by a Commissioner or a Commission whose independence is guaranteed vis-a-vis the constructor concerned. (NEA).

2108 Economics

REFER ALSO TO CITATION(S) 30708, 30710, 30711, 30713, 30735, 30739, 30743, 30756, 30757, 30780, 30795, 31041

30791 **The effect of plant reliability improvement in the cost of generating electricity.** Nejat, S.; Sanders, R.C.; Tsoulfanidis, N. (University of Missouri-Rolla Nuclear Engineering Program, Rolla, Missouri 65401). *Nuclear Technology;* **56**: No. 2, 372-391(Feb 1982).

The objective of this investigation is to study the economic benefits in operating a nuclear power plant, as a result of improving the availability of the secondary (steam) loop of the plant. A new method has been developed to obtain availability, frequency of failure, probability and frequency of operation, cycle time, and uptime for different capacity states of a parallel series system having components with failure and repair rates distributed exponentially in

time. The method has been applied to different subsystems, systems, and the secondary loop of a plant as a whole. The effect of having spare parts for several components, as measured by savings in the generation of electricity, is also studied. The Kettelle algorithm was applied to determine optimal allocation of spare parts to achieve maximum availability or minimum cost of electricity, subject to a fixed spare parts budget. The savings per year for optimal spare parts allocation and different spare parts budgets were obtained. The results show that the utility will save its customers a large amount of money if spare parts are purchased, especially at the beginning of the plant operation, and are allocated judiciously.

30792 **Optimization of fuel cycle strategies with constraints on uranium availability.** Silvennoinen, P.; Vira, J.; Westerberg, R. (Technical Research Centre of Finland, Nuclear Engineering Laboratory P.O. Box 169, SF-00181 Helsinki 18). *Nuclear Technology;* **56**: No. 1, 72-80(Jan 1982).

Optimization of nuclear reactor and fuel cycle strategies is studied under the influence of reduced availability of uranium. The analysis is separated in two distinct steps. First, the global situation is considered within given high and low projections of the installed capacity up to the year 2025. Uranium is regarded as an exhaustible resource whose production cost would increase proportionally to increasing cumulative exploitation. Based on the estimates obtained for the uranium cost, a global strategy is derived by splitting the installed capacity between light water reactor (LWR) once-through, LWR recycle, and fast breeder reactor (FBR) alternatives. In the second phase, the nuclear program of an individual utility is optimized within the constraints imposed from the global scenario. Results from the global scenarios indicate that in a reference case the uranium price would triple by the year 2000, and the price escalation would continue throughout the planning period. In a pessimistic growth scenario where the global nuclear capacity would not exceed 600 GW(electric) in 2025, the uranium price would almost double by 2000. In both global scenarios, FBRs would be introduced, in the reference case after 2000 and in the pessimistic case after 2010. In spite of the increases in the uranium prices, the levelized power production cost would increase only by 45% up to 2025 in the utility case provided that the plutonium is incinerated as a substitute fuel.

2109 Process Heat Reactors

REFER ALSO TO CITATION(S) 30098, 30748

30793 (INIS-mf—8928, pp 30-46) **Application of heat storage in increasing operating flexibility of newly built WWER type reactor power plants in the CSSR for peak electric power generation and for offsetting plant capacity decrease due to heat supply.** Spatny, M. (Zavod Vystavby Elektraren, Prague (Czechoslovakia)). 1981. (In Czech). NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780241. (CONF-8112102—Vol.1).

From Conference on scientific research and production introduction studies of light water reactor power plants; Karlovy Vary, Czechoslovakia (1 Dec 1981).

In order to increase the production of electric energy during power peaks a method is suggested for heat storage. At the Dukovany nuclear power plant this is the heat storage in hot feed water based on heating a greater amount of turbine condensate. At the Jaslovske Bohunice nuclear power plant V-2 the possibility is being studied of securing heat offtake from the condensing turbines, this both for power and heating purposes. At the Mochovce nuclear power plant V-4 they are concerned with a combined generation of power and heat from the heating process water of turbines with modified design. The operation is described of the heat offtake from the heating process water at the Temelin nuclear power plant V-5. (M.D.).

30794 (INIS-mf—8966, pp vp) **Nuclear energy for oil sands. A technical and economic feasibility study.** Bancroft, A.R. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). 1982. NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780360. (AECL—7677; CONF-8204158—).

From Nuclear information seminar; Calgary, Alberta, Canada (7 Apr 1982).

In working partnership with a number of Alberta-based companies an AECL (Atomic Energy of Canada Limited) study team assessed the technical and economic feasibility of using a nuclear reactor to raise the production steam for the recovery of bitumen. Technically sound concepts have been identified for using CANDU reactors for the in-situ recovery of bitumen from oil sands. Over the life of an oil sands project a steam supply system based on a nuclear reactor is expected to offer a substantial cost advantage (25 - 50 %) over the alternative system based on coal as the make-up fuel. Steam from natural gas is marginally more expensive than that from coal because the cost of natural gas is expected to escalate at a rate higher than inflation. For shallow deposits (150 -250 metres) using intermediate pressure steam, the commercially proven Pressurized Heavy Water (PHW) reactor is most suitable. For deeper deposits (250 - 650 metres), the PHW reactor can provide the higher pressure steam using a compressor, but only with a reduction in thermal efficiency that substantially reduces its cost advantage. The CANDU Organic Cooled Reactor (OCR), however, can provide a high pressure steam required with the large cost advantage. The economic benefit offered by nuclear steam supply systems, a saving of $2-4 per barrel of product, is large enough to justify the commitment of a more detailed study.

30795 (INIS-mf—8966, pp vp) **Small reactors for low-temperature heating.** Hilborn, J.W.; Glen, J.S. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). 1982. NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780360. (CONF-8204158—).

From Nuclear information seminar; Calgary, Alberta, Canada (7 Apr 1982).

For regions which do not have abundant long term supplies of oil, gas, or electricity, nuclear reactors for heating large buildings are a future energy option. In Canada, the first installations might be in remote arctic communities where heating costs are highest. Atomic Energy of Canada Limited is studying the feasibility of units in the range 2 to 20 MWt. Based on the inherently safe SLOWPOKE research reactor, the proposed heating reactor would produce hot water at temperatures less than 100° C. It would be unattended most of the time, responding automatically to daily variations in load demand. The reactor core would contain enough uranium fuel to last two heating seasons. Thermohydraulic tests have been carried out on an electrically heated tube simulating a single fuel element, and a 31-element test rig simulating the core and primary coolant circuit is under construction. Preliminary cost estimates indicate that heat from a 2 MW(t) SLOWPOKE-type reactor compares favourably with heat from electricity and imported oil, but is significantly more expensive than the corresponding energy from natural gas. If the current studies at the Chalk River Nuclear Laboratories confirm technical and economic feasibility, a 2 MWt prototype reactor will be built at Chalk River in 1984/85.

22 NUCLEAR REACTOR TECHNOLOGY

30796 (INIS-BR—95) **3. National Meeting of Reactor Physics.** (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1982. 580p. (CONF-821270—). NTIS (US Sales Only), PC A25/MF A01. Order Number DE84780120.

From 3. national meeting of reactor physics; Itaipava, RJ, Brazil (12 Dec 1982).

Individual items in scope for the data base are processed separately.

2201 Theory And Calculation

REFER ALSO TO CITATION(S) 31398

30797 **(NUREG/CR—3360) Computer program CDCID: an automated quality control program using CDC update.** Singer, G.L.; Aguilar, F. (EG and G Idaho, Inc., Idaho Falls (USA)). Apr 1984. Contract AC07-76ID01570. 62p. (EGG—2302). NTIS, PC E04 - GPO; GPO Dep. Order Number DE84010550.

Paper copy only, copy does not permit microfiche production; Includes 1 sheet of 24x reduction microfiche.

A computer program, CDCID, has been developed in coordination with a quality control program to provide a highly automated method of documenting changes to computer codes at EG and G Idaho, Inc. The method uses the standard CDC UPDATE program in such a manner that updates and their associated documentation are easily made and retrieved in various formats. The method allows each card image of a source program to point to the document which describes it, who created the card, and when it was created. The method described is applicable to the quality control of computer programs in general. The computer program described is executable only on CDC computing systems, but the program could be modified and applied to any computing system with an adequate updating program.

30798 **Proposed ANS standard 8.14: Subcritical limits of fissile materials with neutron absorbers for criticality control, Part 1.** Carter, R.D. (Rockwell Hanford Operations, P.O. Box 800, Richland, WA 99352). *Transactions of the American Nuclear Society;* **45**: 355-356(Oct 1983).

30799 **Derivation of a dose mean value of lineal energy from variance measurements of a secondary electron emission current.** Forsberg, B. (Karolinska Institute, Department of Radiation Physics S-104 01 Stockholm). *Nuclear Science and Engineering;* **81**: No. 2, 283-290(Jun 1982).

In this investigation, variance measurements of the secondary electron emission current from an evacuated chamber have been performed and a formula to calculate y^- /SUB D/ in these experiments has been derived. The value obtained for y^- /SUB D/ is within 50% of y^- /SUB D/ obtained with a gas detector and a factor of 2 greater than calculated values. The mean track length and the V /SUB track/ term were also calculated for this irradiation geometry, V /SUB track/ being of the same order of magnitude as V /SUB track/ for a sphere.

30800 **Statistical screening of input variables in a complex computer code.** Krieger, T.J. (Brookhaven National Laboratory, Department of Nuclear Energy Upton, New York 11973). *Nuclear Science and Engineering;* **81**: No. 2, 281-283(Jun 1982).

A method is presented for "statistical screening" of input variables in a complex computer code. The object is to determine the "effective" or important input variables by estimating the relative magnitudes of their associated sensitivity coefficients. This is accomplished by performing a numerical experiment consisting of a relatively small number of computer runs with the code followed by a statistical analysis of the results. A formula for estimating the sensitivity coefficients is derived. Reference is made to an earlier work in which the method was applied to a complex reactor code with good results.

30801 **New calculation of prompt fission neutron spectra and average prompt neutron multiplicities.** Madland, D.G.; Nix, J.R. (Los Alamos National Laboratory, Theoretical Division P.O. Box 1663, Los Alamos, New Mexico 87545). *Nuclear Science and Engineering;* **81**: No. 2, 213-271(Jun 1982).

On the basis of standard nuclear evaporation theory, the authors calculate the prompt fission neutron spectrum N(E) as a function of both the fissioning nucleus and its excitation energy. To simulate the initial distribution of fission-fragment excitation energy and the subsequent cooling of the fragments as neutrons are emitted, they take the distribution of fission-fragment residual nuclear temperature to be triangular in shape, extending linearly from zero to a maximum value T /SUB m/ . This maximum temperature is determined from the average energy release, the separation energy and kinetic energy of the neutron inducing fission, the total average fission-fragment kinetic energy, and the level density parameter of the Fermi gas model. The neutron energy spectrum for fixed residual nuclear temperature is integrated over this triangular distribution to obtain the neutron energy spectrum in the center-of-mass system of a given fission fragment, which is then transformed to the laboratory system. When the cross section σ /SUB c/ for the inverse process of compound nucleus formation is assumed constant, N(E) is the sum of a four-term closed expression involving the exponential integral and the incomplete gamma function for the light fragment and an analogous result for the heavy fragment. The authors also calculate N(E) by numerical integration for an energy-dependent cross section σ /SUB c/ that is obtained from an optical model; this shifts the peak in N(E) to somewhat lower neutron energy and changes the overall shape slightly.

30802 **Effect of fluorescence, bremsstrahlung, and annihilation radiation on the spectra and energy deposition of gamma rays in bulk media.** Subbaiah, K.V.; Gopinath, D.V.; Natarajan, A.; Trubey, D.K. (Reactor Research Centre, Safety Research Laboratory, Kalpakkam). *Nuclear Science and Engineering;* **81**: No. 2, 172-195(Jun 1982).

The contribution of bremsstrahlung, annihilation, and fluorescence radiation to the spectra of scattered gamma radiation and to the dose buildup factors has been investigated as a function of source energy, atomic number, and sample thickness over an energy range of 0.1 to 8 MeV. The computations were performed with the one-dimensional transport code ASFIT modified to take into account all the secondary radiations. The required mathematical formulation, along with representative results obtained for uranium, lead, iron, and water, typifying materials of very high, high, medium, and low atomic number, are presented and discussed. A noticeable effect of including bremsstrahlung sources is the general softening of the scattered radiation spectra inside the medium and at the exit. This effect is more pronounced in materials of high atomic number. The bremsstrahlung contribution is seen most prominently in the reflection spectra above 0.511 MeV, where the contribution from other processes is insignificant. The effect of annihilation radiation is significant in the region between 0.511 MeV and the K edge, below which the effects of fluorescence radiation overshadow all others. Peaks and discontinuities characteristic of single scatterings of these radiations are seen in the reflection spectra, gradually disappearing with depth in the medium. The effect of fluorescence on the dose buildup factor is spectacular for source energies close to the K edge and falls off rapidly thereafter. The impact of bremsstrahlung, on the other hand, steadily rises with source energy. The influence of annihilation radiation is comparatively modest and is significant only for systems of intermediate atomic numbers.

30803 **Binary operators and their Green's functions.** Sheff, J.R. (University of Lowell, 307 Nuclear Center, Lowell, Massachusetts 01854). *Nuclear Science and Engineering;* **81**: No. 1, 119-136(May 1982).

Three topics are considered. First, the Langevin approach to neutron noise is used as a basis and guide to develop solutions and solution techniques for the ChapmanKolmogorov forward equation approach to neutron noise. The approach followed throughout this first part is that of solution by means of Green's functions. A particular form for the binary operator Green's function was picked on the basis of the Langevin method. Second, the basic solution technique using the particular Green's function form mentioned above is proven to be a correct and a general result. It is proven that the binary operator is always separable and that the Green's function could be written as the product of two single operator Green's functions. This is a new result. Third and finally, the forward equation approach of Chapman-Kolmogorov is generalized to include time allowing differential equations for second and higher order correlation functions to be developed directly. The principal result of the last section, the differential equation for correlation function of the neutron density, is new. Its derivation is really outside of or broader than the scope indicated by the title of the paper.

30804 Asymptotic equivalence of neutron diffusion and transport in time-independent reactor systems. Borysiewicz, M.; Mika, J.; Spiga, G. (Institute of Nuclear Research, Swierk, 05400 Otwock). *Nuclear Science and Engineering;* **81**: No. 1, 110-118(May 1982).

Presented in this paper is the asymptotic analysis of the time-independent neutron transport equation in the second-order variational formulation. The small parameter introduced into the equation is an estimate of the ratio of absorption and leakage to scattering in the system considered. When the ratio tends to zero, the weak solution to the transport problem tends to the weak solution of the diffusion problem, including properly defined boundary conditions. A formula for the diffusion coefficient different from that based on averaging the transport mean-free-path is derived.

30805 A comparison of maximum likelihood and other estimators of eigenvalues from several correlated Monte Carlo samples. Beer, M. (Brookhaven National Laboratory, National Nuclear Data Center Upton, New York 11973). *Nuclear Science and Engineering;* **76**: No. 3, 295-301(Dec 1980).

The maximum likelihood method for the multivariate normal distribution is applied to the case of several individual eigenvalues. Correlated Monte Carlo estimates of the eigenvalue are assumed to follow this prescription and aspects of the assumption are examined. Monte Carlo cell calculations using the SAM-CE and VIM codes for the TRX-1 and TRX-2 benchmark reactors, and SAM-CE full core results are analyzed with this method. Variance reductions of a few percent to a factor of 2 are obtained from maximum likelihood estimation as compared with the simple average and the minimum variance individual eigenvalue. The numerical results verify that the use of sample variances and correlation coefficients in place of the corresponding population statistics still leads to nearly minimum variance estimation for a sufficient number of histories and aggregates.

30806 Fundamental mode decay constants for small two- and three-dimensional pulsed neutron moderator assemblies. Kumar, V.; Sahni, D.C. (Bhabha Atomic Research Centre, Theoretical Reactor Physics Section Bombay 400 085). *Nuclear Science and Engineering;* **76**: No. 3, 282-294(Dec 1980).

A method has been developed to calculate the fundamental mode decay constants in two- and three-dimensional pulsed neutron moderator assemblies using the separable form of the scattering kernel in the transport equation. The method uses the Fourier transform of the integral transport equation and is an extension of the method developed by Sahni to treat monoenergetic criticality problems for two- and three-dimensional geometries. The new kernel of the integral transform equation is factored into components depending on only one of the dimensions of the assembly. This property is further exploited by use of a single Fourier mode approximation in one or more dimensions while the kernels in the remaining dimensions are retained in their respective forms. In the author's numerical work, three simple forms of the scattering cross section are used for calculating the matrix elements of the relevant equations accurately. Numerical results are presented for the asymptotic decay constant in a one-dimensional slab, a one-dimensional cylinder, two-dimensional infinite rectangular prisms, and three finite cylinders of different height-to-diameter ratios. The relation between the asymptotic decay constant and the geometrical buckling in the transport and diffusion approximations are also calculated for interpreting the results in terms of extrapolation lengths.

30807 On the solution of linear diffusion problems in media with moving boundaries. Leite, S.B.; Ozisik, M.N.; Verghese, K. (North Carolina State University Departments of Nuclear and Mechanical and Aerospace Engineering Raleigh, North Carolina 27650). *Nuclear Science and Engineering;* **76**: No. 3, 345-350(Dec 1980).

A generalized integral transform technique is used to obtain various order analytical solutions to the problems of linear diffusion of radioactive atoms in an eroding slab, cylinder, or sphere subjected to a general boundary condition of the third kind. The zeroth- and first-order solutions obtained in this manner are compared with the exact solution; the results are highly accurate for most practical cases. The proposed technique is sufficiently versatile to cover a variety of heat and mass transfer problems in media with moving boundaries.

30808 Transport of thermal neutrons in D_2O in the temperature Range 5 to 60°C based on a new scattering kernel. Bansal, R.M.; Kothari, L.S.; Tewari, S.P. (University of Delhi, Department of Physics and Astrophysics, Delhi-110007). *Nuclear Science and Engineering;* **76**: No. 1, 18-29(Oct 1980).

A new scattering kernel for heavy water has been proposed. The kernel takes into account the chemical binding energy effects and also includes the rotational and intramolecular vibrational modes. Using this scattering kernel, various neutron transport processes in the temperature range 5 to 60°C have been studied and compared with the corresponding experimental results. The calculated results include total neutron scattering cross section at 20°C; asymptotic decay of neutron pulses in the temperature range 5 to 60°C and temperature variation of the diffusion coefficient and diffusion cooling coefficient; timedependent spectra inside finite-sized assemblies of heavy water at 20 and 43.3°C thermalization time; and diffusion length and space-dependent study in pure and poisoned assemblies of heavy water. The calculated results are in good agreement with the experimental results. At some places notable differences are observed between the results obtained using our scattering kernel and those based on the Honeck kernel.

2202 Components And Accessories

REFER ALSO TO CITATION(S) 30868, 31201, 31278, 31424

30809 (DE—83048804) CHART; iodine decay heat on charcoal adsorbers. Software. Shields, R.P.; Siman-Tov, M. (Oak Ridge National Lab., TN (USA)). 1984. mag tapep. (ANL/NESC—804). NTIS (US Sales Only); Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

CHART was developed for the thermal analysis of the charcoal adsorber in a reactor containment system; maximum temperatures caused by iodine adsorption under accident conditions are estimated. A differential equation relating the charcoal slab temperature to the heat generation rate, air flow rate, and the heat parameters of air and charcoal is solved in both one and three dimensions. Principal consideration is given very low flow rates and times soon after accident onset, the conditions which pose the greatest threat to the charcoal. CHART is limited to maxima of 1750 lattice points, 100 regions, 50 materials, 50 boundary conditions, 100 fine lattice lines along any axis, 50 gross lattice lines along any axis, 20 heat generation functions, 25 initial temperature functions, 50 position-dependent functions, 20 time-dependent functions. Reference report, ORNL-4602. (ERA citation 08:023583)...Software Description: IBM360,370,303x; FORTRAN IV; OS/360,370; CHART requires approximately 465K bytes of storage for execution and the standard input and output units.

30810 (ND-R—892(R)) Stress analysis of a rotating cylinder experiment to determine crack growth in thick section steel. Reading, K.; Clayton, A.M. (UKAEA Risley Nuclear Power Development Establishment). Jun 1983. 24p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701733.

An experiment has been proposed to validate fracture assessment methods for thick walled components under 'upper shelf' conditions using a thick walled cylinder. The cylinder will be rotated to produce primary stresses. To produce secondary stresses it will be heated and then quenched on the inside face. The stress system is compared to that of a pressure vessel. Suitable dimensions of the cylinder to obtain 2 mm of slow ductile tearing of a full length longitudinal starter crack on the inside wall, before net section yield occurs are specified. The results from a specially developed computer program to analyse the cylinder fracture behaviour under thermal shock are described. It is shown that the rotating cylinder adequately reproduces the essential features of fracture in a large pressure vessel.

30811 **(NUREG/CR—3604) Bolting applications.** Czajkowski, C.J. (Brookhaven National Lab., Upton, NY (USA)). May 1984. Contract AC02-76CH00016. 301p. (BNL-NUREG—51735). NTIS, PC A14; 3 - GPO $7.50; GPO Dep. Order Number DE84012854.

Paper copy only, copy does not permit microfiche production.

An investigation of bolting practices specific to the nuclear industry was performed. The report covered a large spectrum of topics e.g., bolts embedded in concrete, specifications, inspection of bolting, both at receipt and inservice. Plots of preload versus yield strength for different bolting materials in different environments are presented as well as information relative to the stress corrosion cracking resistance of the more recent reactor internals bolting materials A286 and Inconel X-750. Part of the report contains input by Standard Pressed Steel Inc. (a bolting consultant) relative to bolting standards, cottering methods and potential areas for bolting improvement.

30812 **(NUREG/CR—3743) Impact of nondestructive examination unreliability on pressure vessel fracture predictions.** Simonen, F.A. (Pacific Northwest Lab., Richland, WA (USA)). May 1984. Contract AC06-76RL01830. 29p. (PNL—5062). NTIS, PC A03/MF A01 - GPO $3.50; GPO Dep. Order Number DE84012818.

This report reviews the significant variables of flaw depth, length, location and orientation required for fracture mechanics evaluations of pressure vessel integrity. Results of calculations are presented which emphasize pressurized thermal shock (PTS) and the significance of flaws located at or near the inside surface of the vessel. For PTS conditions, previous studies have shown that vessel failure probability is relatively insensitive to flaw depth. In this study the impact of flaw length is also evaluated, indicating the importance of fully characterizing all flaw dimensions by NDE. Results of other evaluations are presented, showing the importance of accurately locating flaws by NDE. The influence of vessel cladding is emphasized, with the relative significance of flaws through the clad and at various depths below the clad being addressed.

30813 **(NUREG/CR—3771) Vessel V-7 and V-8 repair and characterization of insert material. Final report.** Domian, H.A. (Babcock and Wilcox Co., Alliance, OH (USA). Research and Development Div.). May 1984. Contract AC05-84OR21400. 101p. (ORNL/Sub—82-52845/1). NTIS, PC A06/MF A01; 1 - GPO; GPO Dep. Order Number DE84012494.

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Pieces of Type SA508-2 steel, specially tempered to produce a high-impact-transition temperature, were welded in the side walls of Intermediate Test Vessels V-7 and V-8. These vessels are to be tested by the Oak Ridge National Laboratory (ORNL) in the Pressurized-Thermal-Shock (PTS) Project of the Heavy-Section Steel Technology (HSST) Program. A comparable piece of forging taken from the same source and heat treated with the vessels was characterized for its mechanical properties to provide data for use in the PTS tests.

30814 **Controlling the quality of replacement parts in nuclear station, class 1E equipment.** Pierson, R.K.; Clemons, R.W. (GA Technologies, Inc. P.O. Box 81608 San Diego, CA 92138). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 841-843(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Nuclear station owners have traditionally purchased replacement parts for Class 1E equipment from the original supplier of the equipment. By this method, part and equipment quality could be maintained. In recent years, however, this traditional source of parts has continuously declined as an increasing number of original equipment suppliers stop producing Class 1E equipment or no longer stock parts for older equipment. When replacement parts for Class 1E equipment are not obtainable from the original suppliers, equipment owners have created a variety of methods for assuring the quality of parts obtained from other sources. A standard that provides direction and guidance for maintaining the quality of Class 1E equipment when repaired with parts from alternate sources is, therefore, needed to assure the methods in use are satisfactory and to alert the equipment owners to additional acceptable methods. The standard has now been proposed. IEEE Standard P934 (June, 1983 Draft): "Requirements for Replacement Parts for Class 1E Equipment in Nuclear Power Generating Stations" (Ref-3) consist of an introductory section followed by sections on part selection, procurement, replacement (including inspections and tests), nonconforming conditions and records. The proposed standard also includes a non-mandatory appendix on acceptable procurement methods and a summary intended to assist the user in selecting a proper procurement method.

30815 **The use of historical data storage and retrieval systems at nuclear power plants.** Langen, P.A. (Combustion Engineering, Inc., Windsor, CT). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 844-848(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

In order to assist the nuclear plant operator in the assessment of useful historical plant information, C-E has developed the Historical Data Storage and Retrieval (HDSR) system, which will record, store, recall, and display historical information as it is needed by plant personnel. The system has been designed to respond to the user's needs under a variety of situations. The user is offered the choice of viewing historical data on color video displays as groups or on computer printouts as logs. The graphical representation is based upon a sectoring concept that provides a zoom-in enlargement of sections of the HDSR graphs.

30816 **Computerized plant maintenance management information systems overview for nuclear power plants.** Kozusko, A.M. (Quadrex Corporation 1005 Beaver Grade Road Coraopolis, Pennsylvania 15108). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 849-852(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The evolution of the computer has and continues to have a great impact on society and industry. We are in an adjustment cycle with the current computer evolution, but more importantly some of us are trying to adjust to meet the changes for the coming decade. Hardware and software are continually being enhanced. Computers are becoming more powerful and will eventually provide an effective man/machine interface. This paper presents a discussion of computer systems and some of their features impacting power plant maintenance.

30817 **Acoustic imaging of vapor bubbles through optically non-transparent media.** Kolbe, W.F.; Leskovar, B.; Turko, B.T. (Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 726-732(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

A preliminary investigation of the feasibility of acoustic imaging of vapor bubbles through optically non-transparent media is described. Measurements are reported showing the echo signals produced by air filled glass spheres of various sizes positioned in an aqueous medium as well as signals produced by actual vapor bubbles within a water filled steel pipe. In addition, the influence of the metallic wall thickness and material on the amplitude of the echo signals is investigated. Finally several examples are given of the imaging of spherical bubbles within metallic pipes using a simulated array of acoustic transducers mounted circumferentially around the pipe. The measurement procedures and a description of the measuring system are also given.

2203 Fuel Elements

30818 **(IAEA-R—2467-F) Water reactor fuel characterization. Part of a coordinated programme on non-destructive techniques for reactor fuel characterization. Final report for the period 15 November 1979 - 15 June 1983.** Levai, F. (International Atomic Energy Agency, Vienna (Austria)). Jun 1983. 166p. NTIS (US Sales Only), PC A08/MF A01. Order Number DE84701731.

The report describes an optical/mechanical system of examining nuclear reactor fuel bundles by tomographic imaging using high contrast X-ray film. This low cost system does not use expensive detectors or digital computers. The apparatus assembled from ordinary and available components consists of a 2π scanner, a back projector and filters. Although the system described and tested is based on transmission tomography, the report also discusses the extension of the concept to emission tomography.

30819 **(IWGFPT—3) Specialists' meeting on internal fuel rod chemistry.** (International Atomic Energy Agency, Vienna (Austria). International Working Group on Fuel Performance and Technology for Water Reactors). Mar 1979. 143p. (CONF-790160—). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84900850.

From IAEA specialist's meeting on internal fuel rod chemistry; Erlangen, F.R. Germany (23 Jan 1979).

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Fifteen papers are presented on the chemistry of light water reactor fuel rods under irradiation. (HDR)

30820 **(IWGFPT—14) IAEA specialists' meeting on power ramping and cycling behaviour of water reactor fuel. Summary report.** (International Atomic Energy Agency, Vienna (Austria). International Working Group on Fuel Performance and Technology for Water Reactors). Jul 1983. 243p. (CONF-8209120—Summ.). NTIS (US Sales Only), PC A11/MF A01. Order Number DE84900986.

From IAEA specialists' meeting on power ramping and cycling behaviour of water reactor fuel; Petten, Netherlands (8 Sep 1982).

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The meeting was organized in five sessions: (1) power ramping and power cycling programs in power and research reactors; (2) experimental methods; (3) power ramping and cycling results; (4) investigations and results of separate effects: A) especially related to PCI, defect mechanism, mechanical response, fuel design, B) especially related to fission gas release; and (5) operational strategies, recommendations and economic implications. The following summary and recommendations were discussed and approved: power ramping under normal operating conditions and day-night (weedend) power cycling in water reactors can be accommodated by present fuel technology and by in-core ramp control and limitation systems; the underlying fuel performance data can be derived from test reactor results and power reactor experience through careful extrapolation; better understanding of the fundamental phenomena and of the influence of all fuel irradiation variables, including remedies is, however, required for further improvement; continuation of experimental and analytical work is therefore felt necessary using sophisticated in-pile instrumentation and refined hot cell techniques; and the results of ongoing and planned R and D programs should be reviewed in a follow-up meeting in about 2 to 3 years' time including items like: extended burn-up performance and load follow behavior, development of remedy fuel, and possible new requirements from the utilities.

30821 (ZfI-Mitt—71, pp 317-331) **Radiation evaluation techniques and facilities used for quality assurance of fuel elements and fuel assemblies for nuclear power plants.** Shtan', A.S. (Vsesoyuznyj Nauchno-Issledovatel'skij Inst. Radiatsionnoj Tekhniki, Moscow (USSR)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Non-destructive techniques and systems used for quality control of fuel elements and fuel assemblies in the process of their fabrication are needed. Fuel elements are the main components of a reactor core. The efficiency and safety of a nuclear power plant substantially depend on the fuel element quality.

2204 Control Systems

30822 **(AECL—7244) Multivariable control in nuclear power stations. Optimal control.** Parent, M.; McMorran, P.D. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Nov 1982. 40p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701869.

Multivariable methods have the potential to improve the control of large systems such as nuclear power stations. Linear-quadratic optimal control is a multivariable method based on the minimization of a cost function. A related technique leads to the Kalman filter for estimation of plant state from noisy measurements. A design program for optimal control and Kalman filtering has been developed as part of a computer-aided design package for multivariable control systems. The method is demonstrated on a model of a nuclear steam generator, and simulated results are presented.

30823 **(AECL—7841F) Multivariable controller for a 600 MWe CANDU nuclear power plant.** Mensah, S. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.; Montreal Univ., Quebec (Canada)). Nov 1982. 248p. (In French). NTIS (US Sales Only), PC A11/MF A01. Order Number DE84701871.

The problems of designing a multivariable regulator for a nuclear power station of the Gentilly-2 type are studied. A reduced model, G2LDM, linearized around steady state operating conditions, is derived from the non-linear model G2SIM. The resulting linear model is described by state-space equations. Good agreement is demonstrated between the transient responses of both models. Properties of G2LDM are assessed by performing controllability and observability tests, cyclicity and rank tests, and eigenanalysis. A comprehensive set of application-orinented algorithms which allow multivariable controller design with closed-loop pole-assignment techniques are implemented in a computer-aided design package via several modules. A general scheme for the implementation of a multivariable controller in G2SIM is designed, and simulation tests show satisfactory performance of the controller.

30824 **(EGG-M—08784) Safety monitoring in process and control.** Esparza, V. Jr.; Sebo, D.E. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 9p. (CONF-8404138—4). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012537.

From 8. national engineering symposium of the Mexican American Engineering Society; Albuquerque, NM, USA (11 Apr 1984).

Safety Functions provide a method of ensuring the safe operation of any large-scale processing plant. Successful implementation of safety functions requires continuous monitoring of safety function values and trends. Because the volume of information handled by a plant operator occassionally can become overwhelming, attention may be diverted from the primary concern of maintaining plant safety. With this in mind EG and G, Idaho developed various methods and techniques for use in a computerized Safety Function Monitoring System and tested the application of these techniques using a simulated nuclear power plant, the Loss-of-Fluid Test Facility (LOFT) at the Idaho National Engineering Laboratory (INEL). This paper presents the methods used in the development of a Safety Function Monitoring System.

30825 **(EGG-M—25983) Design of a generic interactive operator test station.** Venhuizen, J.R. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 6p. (CONF-8404107—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012647.

From Society of Computer Simulation mini conference; Norfolk, VA, USA (20 Apr 1984).

An experimental facility to provide an interactive (both hardware and human interactions) operator test station has been de-

signed and constructed. This facility can be used to test human performance and graphic aids related to nuclear power plant operations. The facility does not attempt to mimic any commercially available devices, rather emphasis is placed on the ability to test a particular computer aid or graphics display under simulated operating conditions. A description of the hardware and software is presented, both for the graphics aids and the simulated nuclear power plant.

30826 **Practical look at control panel enhancement.** Gonzalez, W.R.; Smith, D.L. (Lockheed Missiles and Space Co., Sunnyvale, CA; Lockheed Missiles and Space Co., Inc., Austin, TX). *Nuclear Safety;* **25**: No. 2, 227-237(Mar 1984).

The accident at Three Mile Island has caused attention to be focused on human factors engineering concerns in the design of nuclear power-plant control rooms and in control panels in particular. Examples from a control room review and enhancement task are described and discussed with reference to the need for a careful interpretation of Section 6 of NUREG-0700, which offers guidance for evaluation of control rooms but with very little retrofit information. Two Electric Power Research Institute studies that provide limited retrofit guidance are noted, and recommendations about further research are made.

30827 **Wide range neutron monitor.** Wimpee, L.C.; Itoh, T.; Shirayama, S.; Sturtz, J.P. (G.E. Company, 175 Curtner Avenue, San Jose, CA). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 649-654(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The Wide Range Neutron Monitor (WRNM) is a newly developed neutron monitoring channel which was initially conceived as a means to meet Regulatory Guide 1.97 requirements for post-accident neutron monitoring. The scope was expanded to include the startup monitoring function with the aim of replacing both the source and intermediate range monitors in boiling water reactors. The WRNM, consisting of a newly designed fixed incore regenerative sensor and new electronics, which include both counting and MSV channels has been tested in several reactors and its capabilities have been confirmed. The channel will cover the neutron flux range from 10^3 nv to $1.5x10^{13}$ nv; it has greater than 1 decade overlap between the counting and mean square voltage channels. Because of the regenerative fissile coating the sensor, even though fixed incore, has a life of approximately 6.0 full power years in a 51 kW/liter BWR.

30828 **C-E in-core instrumentation - Functions and performance.** Versluis, R.M. (Combustion Engineering, Inc. P.O. Box 500 Windsor, Connecticut 06095). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 761-765(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The middle and late seventies were a period of maturing of the existing PWR designs for in-core instrumentation and demonstration and exploitation of its capabilities. While initially the in-core instrumentation system was primarily used for neutron flux mapping the later use of the system for continuous core limit monitoring has been very successful in increasing plant productivity. This paper discusses the uses of in-core instrumentation for monitoring and surveillance in PWRs as they have evolved over the years, reviews the performance of C-E's in-core instrumentation, and discusses possible future developments.

30829 **Performance of a nuclear reactor cover-gas monitor using charcoal-Ge gamma-ray spectrometer combination.** Sakai, E. (Japan Atomic Energy Research Institute Tokaimura, Nakagun, Ibarakiken, 319-11, Japan). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 757-760(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Gas-chromatographic measurements on adsorption and desorption characteristics of one type of charcoal at 50°C to -70°C had been measured using non-radioactive standard gases of 5000ppm or 100ppm Kr or Xe in He or Ar carrier. The charcoal was 5 grams of TSURUMI COAL 2GM packed in a 10 cm^3 cylindrical chamber of 40 mm diameter by 8 mm depth. Performance of a charcoal - Ge gamma-ray spectrometer combination was studied using JRR-3(Japan Research Reactor 3) helium cover gas which contained Ar-41 as well as gaseous fission products such as Kr-85m, 85, 87, 88, Xe-133, 135m and 138.

30830 **Aging and seismic performance for safety-related equipment in a mild environment.** Gleason, J.F. (Wyle Laboratories 7800 Governors Drive, West P.O. Box 1008 Huntsville, Alabama 35807). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 837-840(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The dominant aging mechanisms in mild environments (time-temperature (thermal) effects, radiation and operational cycling effects) were investigated for their impact on seismic performance. Sample sets of electrical and electronic safetyrelated components which had been preconditioned were subjected to seismic stresses. The sample sets contained identical components which had been thermally, cyclically and radiation aged as well as unaged. The aging and seismic stresses represented worst case conditions. The results of this program demonstrate the adequacy of the selection process to determine age sensitivity and provide the technical justification for exemption from aging prior to seismic testing for those components which demonstrated no correlation between aging and seismic performance.

30831 **Computerized surveillance test guide system for BWR power plant.** Kinoshita, Y.; Kimura, Y.; Watanabe, N. (Power Generation Control Systems Department Fuchu Works, TOSHIBA Corporation 1-Toshiba-cho, Fuchu-shi, Tokyo, Japan). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 858-861(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

A computerized surveillance test guide system has been developed and installed in an actual process computer. Among its functions and abilities are that it displays about 5,000 lines of guidance in Japanese for Engineered Safety Facilities service tests on color CRT's; that it checks on plant conditions before and after test operation; and that it records test data. Its man-machine interface is performed through surveillance test consoles located in the central control room. This system will improve usefulness in performing and recording surveillance tests by reducing the load on the reactor operator.

2205 Environmental Aspects

REFER ALSO TO CITATION(S) 30329, 30853, 31674

30832 **(ALO—1022) Evaluation of regulatory processes affecting nuclear power plant early site approval and standardization.** (Stone and Webster Engineering Corp., Boston, MA (USA)). Dec 1983. Contract AC04-76DP00789. 185p. NTIS, PC A09/MF A01; GPO Dep. Order Number DE84009967.

This report presents the results of a survey and evaluation of existing federal, state and local regulatory considerations affecting siting approval of power plants in the United States. Those factors that may impede early site approval of nuclear power plants are identified, and findings related to the removal of these impediments and the general improvement of the approval process are presented. A brief evaluation of standardization of nuclear plant design is also presented.

30833 **(DP-MS—84-49) Evaluation of zeolite mixtures for decontaminating high-activity-level water at the Three Mile Island Unit 2 Nuclear Power Station.** Collins, E.D.; Campbell, D.O.; King, L.J.; Knauer, J.B.; Wallace, R.M. (Oak Ridge National Lab., TN (USA); Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). May 1984. Contract AC05-84OR21400;AC09-76SR00001. 20p. (CONF-8406123—1; IAEA-TC—518/4). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012564.

From IAEA Technical Committee meeting on inorganic ion exchangers and absorbents for chemical processing in the nuclear fuel cycle; Vienna, Austria (12 Jun 1984).

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Mixtures of Linde Ionsiv IE-96 and Ionsiv A-51 were evaluated for use in the Submerged Demineralizer System (SDS) that was installed at the Three Mile Island Unit 2 Nuclear Power Station to decontaminate ~ 2780 m^3 of high-activity-level water. The original SDS flowsheet was conservatively designed for removal of cesium and strontium and would have required the use of ~ 60 SDS columns. Mixed zeolite tests were made on a 10^{-5} scale and indicated that the appropriate ratio of IE-96/A-51 was 3/2. A mathematical model was used to predict the performance of the mixed zeolite columns in the SDS configuration and with the intended method of operation. Actual loading results were similar to those predicted for strontium and better than those predicted for cesium. The number of SDS columns needed to process the HALW was reduced to ~ 10. 6 references, 4 figures, 2 tables.

30834 (EPRI-NP—3222, pp 4-6) **Waste management planning for outages.** Richmond, J. Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The need for top management to support waste management planning and implementation is indicated. Reduction in the amount of radwaste produced requires cooperation from all employees.

30835 (EPRI-NP—3222, pp 7-9) **Effect of decontamination on radwaste.** Paris, M. (PASNY, New York, NY). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The effect of the different types of decontamination (reverse electroplating, liquid abrasive, etc.) on the radwaste is discussed.

30836 (EPRI-NP—3222, pp 22-23) **Waste management planning.** Gerber, C. (Niagara Mohawk Power Corp., Lycoming, NY). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

General areas of concern in planning for waste management at nuclear power plants are covered.

30837 (EPRI-NP—3222, pp 24-33) **Utility radwase volume reduction program at Northeast Utilities.** Koste, W. (Northeast Utilities Service Co., Hartford, CT). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The visual aids used in the talk on utility radwaste volume reduction at Northeast Utilities are presented.

30838 (EPRI-NP—3222, pp 35-38) **Improving performance of existing equipment via low capital expenditures.** Propst, R.M. (Duke Power Co., Charlotte, NC). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The experience to date indicates greatest improvements are due to several areas of concentration: operator training and expertise; operating procedure improvements; development and use of operator aids; improved plant administrative controls; and equipment and system modifications.

30839 (EPRI-NP—3222, pp 58-62) **BWR torus decontamination and resulting radwaste impact.** Keating, J. Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

Those BWR nuclear plants equipped with toroidal suppression pools are involved in an ongoing maintenance, repair and modification program. These plants fall into the followig categories: Mark I Torus or Mark II Torus; painted torus or unpainted torus; treated water or untreated water; transuranium isotopes present or not present. Plants requiring the most modification are equipped with the Mark I Torus. Major modification and reapir to any BWR torus has a significant impact on radwaste. If the torus water is treated with chromate, the radwaste impact is substantial. This discussion focuses largely on those BWR plants that treat torus water with chromate.

30840 (EPRI-NP—3222, pp 63-73) **Waste arising from a dilute chemical decontamination.** Denault, R.P. (London Nuclear Ltd., Niagara Falls, Ontario). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The CAN-DECON process developed for the CANDU reactor is directly applicable to Boiling Water Reactors (BWRs). With the addition of a dilute oxidation step, it is also effective on Pressurized Water Reactor (PWR) primary surfaces. The CAN-DECON process is an acidic, regenerative process that dissolves oxide deposits by reductive dissolution. The main features of the process include: low reagent concentration; reagent added directly to the reactor coolant; reagent and dissolved activity removed on ion exchange resins; reactor need not be defuelled; short downtime; regeneration of reagent by cation exchange resin; removal of reagent by mixed bed ion exchange resin; and remote cleaning operation.

30841 (EPRI-NP—3222, pp 74-76) **Liquid abrasive decontamination operating experience.** Voit, R.E. Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The actual work experience with liquid abrasive decontamination at the Salem Nuclear Generating Station is described. Accompanying tables quantify decontamination factors, effectiveness on various materials, rate of decontamination, and secondary waste gerneration.

30842 (EPRI-NP—3222, pp 86-87) **Steam generator decontamination.** Sejvar, J. (Westinghouse Electric Corp., Pittsburgh, PA). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

The purpose of this program is to evaluate the applicability of the Westinghouse abrasive grit/high-pressure water cleaning method in the decontamination of systems and equipment associated with the Three Mile Island Unit 2 facility. This study is part of a comprehensive review of various chemical and mechanical decontamination techniques being conducted for the Electric Power Research Institute by several different contractors. Although the particular application is the Three Mile Island Unit 2 facility, the information is general in nature, such that an assessment of the applicability of the technique to other plants or facilities can be made. The wet abrasive method discussed in this report is a technique that has been developed and utilized extensively in the decontamination of

steam generator channel heads. Application involves the removal of sources of radiation by means of a remotely controlled high pressure spray containing water and an abrasive grit. The process has been demonstrated, by testing and in-plant use, to be an effective decontamination method with no deleterious effects on stainless steel or Inconel surfaces.

30843 (EPRI-NP—3222, pp 92-98) **Experience with stored, dewatered spent resin at Arkansas Nuclear One.** Fellhauer, C. (Arkansas Power & Power & Light Co., Russellville). Aug 1983. EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920058. (CONF-830162—).

From ASME-EPRI radwaste workshop; Charlotte, NC, USA (31 Jan 1983).

Chemical reactions took place in the dewatered spent resin taken from Arkansas-1 reactor. Some explanations are offered.

30844 **(EPRI-NP—3476) PWR waste gas system analysis. Final report.** Miller, A.D.; Best, W.T. (Impell Corp., San Francisco, CA (USA)). May 1984. 69p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920330.

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This report presents the results of the waste gas systems study in three operating pressurized water reactors with particular emphasis on the oxygen concentration in the waste gas decay tanks. This report provides a description of each waste gas system from which the samples were taken, a description of the analytical procedures utilized and the results obtained from each plant. Samples and analysis were acquired from three operating reactors over a period of seven months. The primary purpose of this effort was to gather sufficient operating data to characterize the performance and limitations of PWR Waste Gas Systems. In addition, problems associated with these systems, both procedural and analytical, were identified and corrected.

30845 **(INIS-mf—8745) Site selection of nuclear power plants.** Schnappauf, W. (Bayreuth Univ. (Germany, F.R.). Rechts- und Wirtschaftswissenschaftliche Fakultaet). 8 Dec 1982. 338p. (In German). NTIS (US Sales Only), PC A15/MF A01. Order Number DE84780371.

A stock report of the development of the extent as well as the fundamentals of the conflict about nuclear energy shows that the effective law is both another cause and a mirror of the discussions about it. In total the investigation shows that the planning of site selection suffers from a number of legal problems. They are mainly of structural kind and are concerned with the issues of citizens' participation and graduation of procedures which are central for the management of the conflict. Therefore the present set of instruments is hardly able to contribute to increasing the acceptancy. The kind and extent of issues on one hand as well as the dimension of the conflict on the other make clear that the executive power itself is overtaxed. In this situation the legislative authorities are called up to take responsibility upon themselves. There are no objections from the constitutional or other aspects to legal site selection.

2206 Research, Test, And Experimental Reactors

REFER ALSO TO CITATION(S) 30704, 30774, 30824, 30938, 31149, 31610

30846 **(EGG-M—03984) Development of drag disk and turbines at the INEL.** Goodrich, L.D.; Edson, J.L.; Averill, R.H. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 17p. (CONF-840577—8). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012646.

From 30. international instrumentation symposium; Denver, CO, USA (7 May 1984).

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One of the parameters that must be measured in nuclear safety research is mass flow rate. The reactor environment associated with two-phase flow makes this measurement difficult. To accomplish this at the Idaho National Engineering Laboratory, a drag disk and turbine transducer conbination was developed. These transducers can withstand >2000 h of continuous operation in the reactor environment. Mechanical problems have been solved with these transducers to the point where the electrical coils are now the limiting factor on lifetime. This paper presents the results of the development of the drag disk and turbine with problems and solutions pointed out.

30847 **(HEDL-SA—3066-FP) Reaction rates and neutron spectra in the FFTF at full power.** Wootan, D.W.; Rawlins, J.A.; Dobbin, K.D. (Hanford Engineering Development Lab., Richland, WA (USA)). May 1984. Contract AC06-76FF02170. 23p. (CONF-840614—53). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012378.

From Annual meeting of the American Nuclear Society; New Orleans, LA, USA (3 Jun 1984).

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Results from the HP irradiation test have been shown to reduce uncertainties associated with calculation of axial and radial flux and reaction rate distributions, flux perturbations due to core heterogeneities, neutron flux and reaction rates outside the fuel region, activation of structural components and sodium, and fuel burnup. Improved knowledge of reaction rates (hence burnup, power and flux distributions) is expected to result in better prediction of the performance of experiments irradiated in FFTF.

30848 (INIS-mf—8966, pp vp) **OCR - a western Canadian success story.** Mayman, S.A. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). 1982. NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780360. (CONF-8204158—).

From Nuclear information seminar; Calgary, Alberta, Canada (7 Apr 1982).

The heavy water cooled CANDU power reactor has been a most satisfactory choice for electricity generation in Ontario. However, Atomic Energy of Canada Limited (AECL) has continued to explore variants to the standard CANDU PHWR which could enhance its efficiency, safety and/or economics. Replacement of heavy water with an organic liquid in the cooling circuit appears to offer benefits in operating efficiency, radiation exposure to operators, and cost. In the 1960's AECL built a 40 MW(t) organic cooled test reactor at its Whiteshell Nuclear Research Establishment (WNRE) in Pinawa, Manitoba. The WR-1 reactor at WNRE reached full power in late 1965. Since that time it has exceeded all expectations. Radiation degradation of the coolant has not impeded operation in any way. Coolant flammability has not been a problem. The organic coolant has been shown to have real advantages.

30849 **EBR-II transient operation and test capabilities.** Seidel, B.R.; Cutforth, D.C.; Lentz, G.L. (Argonne National Lab., Idaho Falls, ID (USA)); Lambert, J.D.B. (Argonne National Lab., IL (USA)). pp 391-403 of Irradiation technology. Proceedings of an international topical meeting, Grenoble, France, September 28-30, 1982. Hardt, P. von der; Roettger, H. (eds.) (Commission of the European Communities, Petten (Netherlands). Joint Nuclear Research Center). Dordrecht, Netherlands; D. Reidel (1983). (CONF-820967—).

From International topical meeting on irradiation technology; Grenoble, France (28 Sep 1982).

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The attention and needs of the fuel-pin designer and licenser have focussed on the middle ground between steady-state and accident testing on fuel pins and subassemblies. In the US this middle ground has come to be known as Operational Reliability Testing (ORT). It relates to the off-normal conditions that may be anticipated to occur sometime during the operating life of a commercial reactor. At EBR-II such testing involves pins that have already failed (run-beyond-cladding-breach testing); pins that experience mild-overpower or duty-cycle transients during irradiation (operational-transient testing); and the more general areas of the thermal-hydraulic testing of naturally-distorted clusters of pins under both normal and natural-convection modes of cooling (shutdown-heat-removal testing). This paper updates the status of the preparations and capabilities described in previous publications for operational reliability testing at EBR-II up to the present time when the ORT program is about to begin.

2207 Plutonium And Isotope Production Reactors

REFER ALSO TO CITATION(S) 30829

30850 **(DOE/SR/00001—T23) Alternate analysis criteria for the seismic qualification of the supplementary safety system in Reactor Building 105-L, Savannah River Plant.** Quan, C.N.; Wong, P.W. (URS/John A. Blume and Associates, Engineers, San Francisco, CA (USA)). Sep 1982. Contract AC09-76SR00001. 40p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011137.

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This system consists of a series of stainless-steel, safety-related pipelines, 1/2 to 2 in. in diameter, which run from the control room to the reactor tank. The alternate analysis criteria were developed for the seismic qualification of the piping system, according to the requirements of the 1967 Housner criteria. The application of alternate analysis criteria is a widely employed and accepted procedure for the seismic qualification of large lengths of nuclear power plant small-diameter piping (generally 2 in. in diameter and smaller). Objective of this procedure is to eliminate the need for extensive and costly individual mathematical modeling and dynamic analysis of a great number of small-bore piping systems. The procedure used to develop the alternate analysis criteria consisted of applying equivalent static seismic loading to the various pipe sizes to determine maximum support spacings for each pipe size based on the allowable stress or deflection limits. Guidelines were also developed to provide for sufficient thermal growth capacity, which is typically in direct conflict with seismic requirements.

30851 (EPRI-NP—3402-SR, pp 14.1-14.13) **CRUD sample system design criteria.** Emory, B. (UNC Nuclear Industries, Inc., Richland, WA). Mar 1984. Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920343. (CONF-8308169—).

From EPRI workshop on corrosion product sampling from lhot water systems; Blacksburg, VA, USA (18 Aug 1983).

Viewgraphs are included for a paper presented concerning the coolant sampling system for the N-reactor and the chemical composition of the reactor coolant.

30852 **(ORNL/TM—9174) High Flux Isotope Reactor. Quarterly report, October-December 1983.** Dahl, T.L.; Farrar, M.B. (Oak Ridge National Lab., TN (USA)). May 1984. Contract AC05-84OR21400. 20p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012022.

The beryllium replacement shutdown was continued throughout the quarter. A short cycle was run during the quarter to check the operation of reactor systems and to assure the HFIR experimenters of reactor availability before further maintenance continued. The short test cycle resulted in an on-stream time of 0.2% for the quarter. An in-service inspection of the vessel and primary system piping was completed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code. In addition to the in-service inspection, an eddy-current inspection of the primary heat exchanger tubes was performed to determine the extent of vibration-induced damage.

30853 **(UNI—2619) Assessment of decommissioning alternatives for the shut-down Hanford 100 Area reactors. A Hanford production reactor decommissioning study.** Adams, J.A.; Chattin, J.C.; Griffin, P.W.; Hughes, M.C. (UNC Nuclear Industries, Inc., Richland, WA (USA). Office of Surplus Facilities Management). 15 May 1984. Contract AC06-76RL01857. 96p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012377.

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Of the nine Hanford production reactors, eight have been deactivated since 1971 and are currently being maintained in a safe storage condition. A cost-effective alternative for the ultimate decommissioning of these facilities must be implemented. Abandonment of the facilities is not a feasible alternative because they are deteriorating and could eventually expose radioactive materials to the environment and to human food and water pathways. Three feasible decommissioning alternatives for the shut-down Hanford 100 Area reactors and associated fuel storage basins have been identified and assessed. Those alternatives are identified, along with summary cost, occupational exposure, and schedule data.

30854 **Status report on the fusion breeder.** Moir, R.W. (Lawrence Livermore National Laboratory, Livermore, California). *Alternative Energy Sources;* **5**: 65-81(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

The rationale for hybrid fusion-fission reactors is the production of fissile fuel for fission reactors. A new class of reactor, the fission-suppressed hybrid promises unusually good safety features as well as the ability to support 25 light-water reactors of the same nuclear power rating, or even more high-conversion-ratio reactors such as the heavy-water type. One 4000-MW nuclear hybrid can produce 7200 kg of ^{233}U per year. To obtain good economics, injector efficiency times plasma gain (n /SUB i/ Q) should be greater than 2, the wall load should be greater than 1 X MW m^{-2}, and the hybrid should cost less than 6 times the cost of a light-water reactor. Introduction rates for the fission-suppressed hybrid are unusually rapid.

2208 Propulsion Reactors

REFER ALSO TO CITATION(S) 31692

2209 Reactor Safety

REFER ALSO TO CITATION(S) 30786, 30788, 30809, 31832

30855 **(ANL—82-57) Statistical identification of effective input variables.** Vaurio, J.K. (Argonne National Lab., IL (USA)). Sep 1982. Contract W-31-109-ENG-38. 199p. NTIS MF A01; 1; GPO Dep. Order Number DE84011861.

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A statistical sensitivity analysis procedure has been developed for ranking the input data of large computer codes in the order of sensitivity-importance. The method is economical for large codes with many input variables, since it uses a relatively small number of computer runs. No prior judgemental elimination of input variables is needed. The sceening method is based on stagewise correlation and extensive regression analysis of output values calculated with selected input value combinations. The regression process deals with multivariate nonlinear functions, and statistical tests are also available for identifying input variables that contribute to threshold effects, i.e., discontinuities in the output variables. A computer code SCREEN has been developed for implementing the screening techniques. The efficiency has been demonstrated by several examples and applied to a fast reactor safety analysis code (Venus-II). However, the methods and the coding are general and not limited to such applications.

30856 **(CONF-840701—1-Summ.) Mechanistic prediction of iodine and cesium release from LWR fuel.** Rest, J. (Argonne National Lab., IL (USA)). Dec 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84004008.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

A theoretical model (FASTGRASS) has been used for predicting the behavior of fission gas and volatile fission products (VFPs) in UO_2-base fuels during steady-state and transient conditions. This model represents an attempt to develop an efficient predictive capability for the full range of possible reactor operating conditions. Fission products released from the fuel are assumed to reach the fuel surface by successively diffusing (via atomic and gas-bubble mobility) from the grains to grain faces and then to the grain edges, where the fission products are released through a network of interconnected tunnels of fission-gas-induced and fabricated porosity.

30857 **(CONF-840701—2) Fission product release and fuel cladding interaction in severe-accident tests of LWR fuel.** Strain, R.V.; Osborne, M.F. (Argonne National Lab., IL (USA); Oak Ridge National Lab., TN (USA)). Nov 1983. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01. Order Number DE84004007.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

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The examination of these samples indicated a correlation between the posttest fuel microstructure and the fission product release during the test. As expected, structural changes in the fuel and fission product release increased with test temperature. The effect of steam flow rate, which controls the extent of cladding oxidation, however, was less clear. The amount of fuel-cladding reaction and liquefaction was greatest in the test with a low steam flow rate, which was also the highest temperature test. Other data indicate, however, that extensive fuel-cladding reaction and liquefaction would be expected at ~ 1700°C with reduced steam flow rate (i.e., with reduced oxidation). The similar gas release values and fuel microstructures for the 1700 and 2000°C test are somewhat surprising, but may indicate the influence of the steam conditions on gas release as well as on fuel-cladding reaction. The extent of fuel-cladding interaction in these tests, and the resulting intermediate phases, appear to be consistent with the observations of Hofmann and Kerwin-Peck.

30858 **(CONF-840701—5) Influence of radiation on formation of fission product aerosols during LWR degraded core accidents.** Chuang, C.F.; Im, K.H.; Ahluwalia, R.K. (Argonne National Lab., IL (USA)). 1984. Contract W-31-109-ENG-38. 7p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006402.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

Purpose of this paper is to construct a model for estimating the number density of ions produced by the high radiation levels in reactor core and upper plenum and to use this estimate to determine the effect of ions on the formation of fission product aerosols.

30859 **(CONF-840701—6) RAFT: a computer model for formation and transport of fission product aerosols in LWR primary system.** Im, K.H.; Ahluwalia, R.K. (Argonne National Lab., IL (USA)). 1984. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006416.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

A computer model RAFT (Reactor Aerosol Formation and Transport) has been developed to predict the size distribution and composition of the particles (aerosols) formed from condensation of the fission-product and control rod material vapors released in LWR accidents. The condensation calculations in RAFT are driven by the equilibrium gas phase chemistry of Cs-I-Te-Ag-In-Cd-H-O-Ar system. The formation of the particles is considered to result as the gas becomes supersaturated with Ag, In, Cd, CsI, CsOH, Te_2 or TeO_2 vapor leading to the initiation of homogeneous nucleation. The rate of change in particle size spectrum as a result of homogeneous nucleation, heterogeneous nucleation, agglomeration, convection and deposition is described by the transient population balance equation.

30860 **(CONF-840701—7) Transient fission gas release during direct electrical heating experiments.** Fenske, G.R.; Emerson, J.E.; Savoie, F.E. (Argonne National Lab., IL (USA)). Dec 1983. Contract W-31-109-ENG-38. 9p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006552.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

The gas release behavior of irradiated EBR-II fuel was observed to be dependent on several factors: the presence of cladding, the retained gas content, and the energy absorbed. Fuel that retained in excess of 16 to 17 μmoles/g of fission gas underwent spallation as the cladding melted and released 22 to 45% of its retained gas, while fuel with retained gas levels below ~ 15 to 16 μmoles/g released less than ~ 9% of its gas as the cladding melted. During subsequent direct electrical heating ramps, fuel that did not spall released an additional quantity of gas (up to 4 μmoles/g), depending on the energy absorbed.

30861 **(CONF-8404146—1) Hydrodynamics of post CHF region.** Ishii, M.; De Jarlais, G. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 31p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011711.

From International workshop on fundamental aspects of post-dryout heat transfer; Salt Lake City, UT, USA (2 Apr 1984).

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Among various two-phase flow regimes, the inverted flow in the post-dryout region is relatively less well understood due to its special heat transfer conditions. The review of existing data indicates further research is needed in the areas of basic hydrodynamics related to liquid core disintegration mechanisms, slug and droplet formations, entrainment, and droplet size distributions. In view of this, the inverted flow is studied in detail both analytically and experimentally. Criteria for initial flow regimes in the post-dryout region are given. Preliminary models for subsequent flow regime transition criteria are derived together with correlations for a mean droplet diameter based on the adiabatic simulation data.

30862 **(DOE/CL/01819—T3) Core phenomenology. TEC report on CRBRP PRA Phase II, Task 6C. Final draft report, Revision 1.** (Technology for Energy Corp., Knoxville, TN (USA)). 4 Apr 1984. Contract AC15-83CL01819. 139p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84013305.

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As part of the determination of the risk potential associated with core-damage accident sequences for the CRBRP, a review of the core-damage phenomenology is necessary. How core damage proceeds, its effects on the primary system boundary, and the timing and energetic potential associated with core damage are important to determining the challenge to containment and the ultimate release of fission products to the environment. This chapter addresses the phenomenology related to the core-damage processes and by the use of a core-response event tree, estimates are made of the probability that certain core-response scenarios are followed.

30863 **(DOE/EV—0005/47) Surplus Facilities Management Program. Post-remedial-action survey report for SNAP-8 Experimental Reactor Facility, Building 010 site, Santa Susana Field Laboratories, Rockwell International, Ventura County, California.** Wynveen, R.A.; Smith, W.H.; Sholeen, C.M.; Mayes, C.B.; Justus, A.L.; Flynn, K.F. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 94p. (ANL-OHS/HP—84-102). NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84009591.

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Based on the results of the radiological assessment, the Argonne National Laboratory Radiological Survey Group arrived at the following conclusions: (1) soil contaminated with the radionuclides ^{60}Co and ^{152}Eu of undetermined origin was detected in the southwest quadrant of the Building 010 site. ^{60}Co was also detected in one environmental sample taken from an area northwest of the site and in a borehole sample taken from the area that previously held the radioactive gas hold-up tanks. Uranium was detected in soil from a hole in the center of the building site and in a second hole southwest of the building site. In all cases, the radionuclide levels encountered in the soil were well below the criteria set by DOE for this site; and (2) the direct instrument readings at the surface of the site were probably the result of natural radiation (terrestrial and celestial), as well as shine from the material being stored at the nearby RMDF facility. There was no evidence that the contaminated soil under the asphalt pad contributed detectable levels to the total background readings.

30864 **(EGG-M—06284) RELAP5/MOD2 post-CHF heat and mass transfer models.** Lin, J.C.; Tsia, C.C.; Ransom, V.H.; Johnsen, G.W. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1984. Contract AC07-76ID01570. 12p. (CONF-8404126—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012538.

From 86. annual general meeting of Canadian Institute of Mining; Ottawa, Canada (15 Apr 1984).

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RELAP5/MOD2 is a new version of RELAP5 containing improved modeling features that provide a generic pressurized water reactor transient simulation capability. In particular, the nonequilibrium modeling capability has been generalized to include post critical heat flux (CHF) conditions which occur in severe core damage accidents and large break loss-of-coolant accident. Objective of this paper is to describe the post-CHF wall heat transfer and interphase mass transfer model in RELAP5/MOD2 and to report the developmental assessment results using separate effects experiments. The post-CHF wall heat transfer and interphase mass transfer in RELAP5/MOD2 is mechanistically modeled. The developmental assessment results show that the post-CHF wall heat transfer and the interphase mass transfer are properly modeled. For further modeling improvements, new data with local void fraction or phasic velocity measurement are needed.

30865 **(EGG-M—06384) TRAC-BDl/MOD1 post-dryout wall heat transfer.** Shumway, R.W. (Idaho National Engineering Lab., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 14p. (CONF-8404126—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012543.

From 86. annual general meeting of Canadian Institute of Mining; Ottawa, Canada (15 Apr 1984).

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A comparison of TRAC-BWR heat transfer package with 766 data points is presented. On the average, TRAC-BWR provides a better prediction of the data compared to any single correlation although there is still a large scatter in TRAC-BWR prediction. Regarding any potential changes in the TRAC-BD1/MOD1 wall heat transfer package, it is concluded that no significant improvement in the film boiling area can be made until data with better measurements are obtained and analyzed. Specifically, data is needed which has a wide range of accurately measured void fractions. Heated tube data is also needed which addresses the countercurrent flow transition conditions.

30866 **(EGG-M—06484) Forced convective, nonequilibrium post-CHF heat transfer experiment: description, data analysis and correlation comparison.** Condie, K.G.; Gottula, R.C.; Neti, S.; Sundaram, R.K.; Chen, J.C.; Nelson, R.A. (EG and G Idaho, Inc., Idaho Falls (USA); Lehigh Univ., Bethlehem, PA (USA); Yankee Atomic Electric Co., Westboro, MA (USA)). 1984. Contract AC07-76ID01570. 40p. (CONF-8404146—2). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012615.

From International workshop on fundamental aspects of post-dryout heat transfer; Salt Lake City, UT, USA (2 Apr 1984).

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Forced convective, nonequilibrium post-CHF heat transfer data (766 points) have been obtained at high pressure and low mass flux ranges not previously tested. The data are unique in that the superheated vapor temperature was measured at multiple elevations allowing the direct calculation of vapor generation rates. The data are useful for verification or development of nonequilibrium heat and mass transfer models. Statistical analyses of the data indicated the importance of flow rate represented by the vapor Reynolds number to the 0.8 power. Three additional parameters, a nonequilibrium term, the quench front quality and the distance from the quench front were shown to be statistically significant in fitting the data. The Prandtl number was also included in the fit but was the least significant parameter. Current film boiling heat transfer correlations do not predict the data well. The Dougall-Rohsenow equilibrium correlation is the only one investigated that reasonably predicts the measured wall heat fluxes. Current vapor generation rate models do not adequately predict the measured vapor generation rates.

30867 **(EGG-M—06684) Moving force on a fluid supported beam.** Shah, V.N.; Cook, R.D.; Huang, T.C. (EG and G Idaho, Inc., Idaho Falls (USA). Water Reactor Research Dept.; Wisconsin Univ., Madison (USA). Dept. of Engineering Mechanics). 1984. Contract AC07-76ID01570. 9p. (CONF-840504—4). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012771.

From Southeastern conference on theoretical and applied mechanics; Pine Mountain, GA, USA (10 May 1984).

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A fluid finite element was developed in a previous paper. This element takes into account the effects of sloshing, surface tension, and the viscosity of the fluid. In this paper, the natural frequencies and the mode shapes for the fluid are first obtained. The free vibrations of a beam supported by the fluid and the dynamic response of this fluid supported beam subjected to the moving force are analyzed. Numerical examples are given.

30868 **(EGG-M—06784) Development of a fluid finite element.** Shah, V.N.; Cook, R.D.; Huang, T.C. (EG and G Idaho, Inc., Idaho Falls (USA). Water Reactor Research Dept.; Wisconsin Univ., Madison (USA). Dept. of Engineering Mechanics). 10 May 1984. Contract AC07-76ID01570. 7p. (CONF-840504—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE840127 /0.

From Southeastern conference on theoretical and applied mechanics; Pine Mountain, GA, USA (10 May 1984).

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A fluid finite element is developed with the use of the finite element technique. This element takes into account the effects of sloshing, surface tension and the viscosity of the fluid. The element developed has been proved to be a good one and will be used to model the fluid foundation in the problems of the dynamic response of structures supported by fluids.

30869 **(EGG-M—17883) Application of a thermocouple-correlation-type transit-time flowmeter in a pressurized water reactor environment.** Neff, G.G.; Evans, R.P. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 14p. (CONF-840577—7). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012645.

From 30. international instrumentation symposium; Denver, CO, USA (7 May 1984).

A thermocouple-correlation type of transit-time flowmeter has been developed for use in the primary coolant system of a pressurized water reactor. In this application, an assembly of sensors was used in an attempt to measure a velocity profile within the coolant piping during a simulated loss-of-coolant accident. Results indicate that the flowmeter is usable in subcooled fluid conditions but in saturated fluid conditions the output of the flowmeter cannot be related to flow.

30870 **(EPRI-NP—2744) Assessment of turbine-casing impact code calculations. Final report.** Ravindra, M.K.; Banon, H.; Belytschko, T.; Abrahamson, T.E.; Hyun, Y.W.; Gordon, J.T. Jr.; Reaugh, J.E.; Schuler, K.W.; Witmer, E.A.; French, S.E. (Structural Mechanics Associates, Inc., Newport Beach, CA (USA); Northwestern Univ., Evanston, IL (USA). Dept. of Civil Engineering; Science Applications, Inc., San Leandro, CA (USA); Sandia National Labs., Albuquerque, NM (USA); Massachusetts Inst. of Tech., Cambridge (USA). Aeroelastic and Structures Research Lab.). May 1984. 326p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920393.

This report describes nonlinear, large-deflection, inelastic analyses of the impact of a failed turbine disk segment onto a steel ring representing a turbine casing. Four structural analysis computer codes were used to calculate the response of the same idealized model of a casing structure in an impact test performed previously. The results of the calculations are compared with each other and with response measured in the test. The objective was to assess the code approach as an improved, alternative method for estimating the energies of turbine missiles that might be produced by the rare failure of turbine disks in nuclear plants. The study confirmed that existing codes can model many important aspects of turbine casing impacts. However, further development is needed before this approach could supplant the simpler, more approximate empirical methods traditionally used to estimate missile energies in calculations of turbine missile risk.

30871 **(EPRI-NP—3471) Experimental data report on condensation in a single inverted U-tube.** Nguyen, Q.; Banerjee, S. (California Univ., Santa Barbara (USA). Dept. of Chemical and Nuclear Engineering). May 1984. 118p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920416.

Experiments on condensation in a single inverted U-tube with a cooling-water jacket were performed. The flow regimes, which govern heat removal, were reflux condensation, natural circulation, and an intermediate region where the flow regimes oscillated between these modes. The redistribution of liquid was observed in the transparent test apparatus. The effects of input power, cooling-water flow rate, and the amount of noncondensable gas on flow regimes and the transition points between them were investigated. The results are discussed in qualitative terms, and the data obtained are presented.

30872 **(EPRI-NP—3478) Transient thermal mixing in a full-height PWR cold leg and downcomer. Final report.** Hashemi, A.; Goodman, J.; Munis, A. (Science Applications, Inc., Palo Alto, CA (USA)). May 1984. 364p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920379.

This report describes a series of tests investigating transient cooldown (no primary loop flow) in a transparent model of a PWR cold leg with High Pressure Injection (HPI) and a downcomer. Test conditions were selected to cover a wide range of mixing phenomena expected to occur in a prototypical reactor geometry in the absence of loop flow. Results include both transient temperature data and video movies of the cold leg mixing phenomena. Although the HPI flow rate and the ratio of the difference between HPI and loop fluid densities to the HPI density (Δrho/rho) were varied substantially between the different tests, the temperature distribution on the pressure vessel side of the downcomer below the cold leg elevation was generally uniform and near the inventory thermodynamic mean temperature.

30873 **(HEDL-SA—3055) LWR aerosol containment experiments (LACE) program and initial test results.** Muhlestein, L.D.; Hilliard, R.K.; Bloom, G.R.; McCormack, J.D. (Hanford Engineering Development Lab., Richland, WA (USA)). Nov 1983. Contract AC06-76FF02170. 7p. (CONF-840701—8). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84007169.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

Objectives of the test program are to demonstrate, at large-scale, inherent radioactive aerosol retention behavior for postulated high consequence LWR accident situations, and to provide a data base to be used for aerosol behavior and thermal hydraulic computer code validation. The LACE program is being performed in two phases. The first phase is scoping studies of aerosol retention for a containment by pass sequence (Event V). The second phase considers three accident situations where significant inherent aerosol retention could considerably reduce the calculated consequences of the postulated accidents.

30874 **(INFO—0085) Place of human-factors in the work of the Atomic Energy Control Board.** Barkow, B. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). 29 Jul 1982. 37p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701904.

The AECB do not effectively regulate human factors in nuclear power plants since they have no staff trained to do so. Two new positions are recommended and their activities are outlined. Special problems are identified in the certification of personnel, management information control, and in accommodating human factors to AECB style.

30875 **(INIS-mf—8914) Energy Act 1983.** (British Government, London). 9 May 1983. 34p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780211.

Part II of This Act came into force on 1 September 1983 and is concerned with nuclear installations. Its main purpose is to amend the Nuclear Installations Act 1965 to give effect to the provisions of two Protocols amending the Paris Convention on nuclear third party liability and the Brussels Convention Supplementary to the Paris Convention respectively. The principal effect of these modifications is to increase the sums available to meet claims for nuclear damage. The United Kingdom is a Party to both Conventions and the provisions of the 1983 Act will enable it to ratify the Protocols. (NEA).

30876 **(INIS-mf—8916) 1983 No. 919. The Nuclear Installations (Prescribed Sites) Regulations 1983.** (British Government, London). 1 Sep 1983. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780212.

These Regulations prescribe the sites whose licenses are subject to a lower limit of liability under Section 16(I) of the Nuclear Installations Act 1965, as amended by the Energy Act 1983. Essentially the sites prescribed are the sites of small installations. (NEA).

30877 **(LA-UR—84-1559) Reentry analysis.** Biehl, F.A. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 8p. (CONF-8406131—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012640.

From 1. SP-100 program integration meeting; Danvers, MA, USA (13 Jun 1984).

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This paper presents the criteria, previous nuclear experience in space, analysis techniques, and possible breakup enhancement devices applicable to an acceptable SP-100 reentry from space. Reactor operation in nuclear-safe orbit will minimize the radiological risk; the remaining safeguards criteria need to be defined. A simple analytical point mass reentry technique and a more comprehensive analysis method that considers vehicle dynamics and orbit insertion malfunctions are presented. Vehicle trajectory, attitude, and possible breakup enhancement devices will be integrated in the simulation as required to ensure an adequate representation of the reentry process.

30878 **(LA-UR—84-1620) SOLA-LOOP analysis of a back pressure check valve.** Travis, J.R. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 8p. (CONF-8405164—1). NTIS, PC A02; 3; GPO Dep. Order Number DE84012437.

From IAEA technical committee/workshop on the uses of computer codes for nuclear reactor safety analysis; Varna, Bulgaria (29 May 1984).

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The SOLA-LOOP computer code for transient, nonequilibrium, two-phase flows in networks has been coupled with a simple valve model to analyze a feedwater pipe breakage with a back-pressure check valve. Three tests from the Superheated Steam Reactor Safety Program Project (PHDR) at Kahl, West Germany, are analyzed, and the calculated transient back-pressure check valve behavior and fluid dynamics effects are found to be in excellent agreement with the experimentally measured data.

30879 **(LA-UR—84-1649) Hydrogen transport, mixing, and combustion studies.** Travis, J.R. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 16p. (CONF-8405164—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012455.

From IAEA technical committee/workshop on the uses of computer codes for nuclear reactor safety analysis; Varna, Bulgaria (29 May 1984).

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The transport, mixing, and burning of hydrogen inside containments are receiving a great deal of attention. We present detailed models describing this important phenomena and provide several example calculations to show the versatility and accuracy of the methods.

30880 **(NII—01Suppl.11) Sizewell B. Supplement II. Pressure circuit components.** (Health and Safety Executive, London (UK). Nuclear Installations Inspectorate). Jul 1983. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701873.

The safety of pressure circuit components is discussed with respect to coolant loop piping, coolant pumps, pressuriser, steam

generator channel head and shell, primary component supports and restraints, accumulators, main steam line no-break zone, reactor internals and core, and valves including main steam isolating valves. Outstanding issues are identified and a programme of additional work is discussed.

30881 **(NII—01Suppl.12) Sizewell B. Supplement 12. ALARP strategy for dose reduction.** (Health and Safety Executive, London (UK). Nuclear Installations Inspectorate). Jul 1983. 41p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701874.

The design strategy for keeping all exposures of persons to ionising radiations as low as is reasonably practicable (ALARP) is discussed for the proposed Sizewell B nuclear power station. The safety assessment objectives are discussed together with economic factors, choice of primary circuit materials to minimise the formation of crud, operational chemistry, filtration, decontamination, design modifications and radioactive waste management. It is concluded that a significant attempt has been made to quantify design decisions in respect of the ALARP strategy for dose reduction. A programme of additional work is discussed.

30882 **(NII—01(suppl.13)) Sizewell B. Supplement 13. Human factors.** (Health and Safety Executive, London (UK). Nuclear Installations Inspectorate). Jul 1983. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701875.

An assessment of human factors topics, which are of significant importance to safety, is discussed with respect to design, construction and operation of the proposed Sizewell B nuclear power station. CEGB expertise in ergonomics and fault studies are described. Outstanding issues are identified and a programme of additional work is discussed.

30883 **(NUREG—0776-Suppl.6) Safety evaluation report related to the operation of Susquehanna Steam Electric Station, Units 1 and 2 (Docket Nos. 50-387 and 50-388). Suppl.6.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Mar 1984. 98p. NTIS, PC A05/MF A01 - GPO*. Order Number DE84900962.

In April 1981, the staff of the Nuclear Regulatory Commission issued its Safety Evaluation Report (NUREG-0776) regarding the application of the Pennsylvania Power and Light Company (the applicant and/or licensee) and the Allegheny Electric Cooperative, Inc. (co-applicant) for licenses to operate the Susquehanna Steam Electric Station, Units 1 and 2, located on a site in Luzerne County, Pennsylvania. This supplement to NUREG-0776 addresses the remaining issues that required resolution before licensing operation of Unit 2 and closes them out.

30884 **(NUREG/CP—0047) Transactions of the Eleventh Water Reactor Safety Research Information Meeting.** Szawlewicz, S.A. (comp.). (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). Sep 1983. 377p. NTIS, PC A17/MF A01 - GPO* $8.00. Order Number DE84900042.

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This report contains summaries of papers on reactor safety research work to be presented at the 11th Water Reactor Safety Research Information Meeting. The summary reports highlight the programs and results of nuclear safety research work sponsored by the Office of Nuclear Regulatory Research, USNRC. Summaries of invited papers are also included. The latter represent work on reactor safety research conducted by the electric utilities through the Electric Power Research Institute, the nuclear industry, and various government and industry organizations in Europe and Japan.

30885 **(NUREG/CP—0048-Vol.1) Proceedings of the eleventh water reactor safety research information meeting. Volume 1.** Szawlewicz, S.A. (comp.). (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). Jan 1984. 717p. (CONF-8310143—Vol.1). NTIS MF A01 - GPO* $12.00. Order Number DE84900510.

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

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Separate abstracts were prepared for papers presented in the following areas: (1) Plenary Session; (2) Integral System Experiments; (3) Separate Effects; (4) Foreign Programs in Thermal Hydraulics; and (5) EPRI Safety Research.

30886 (NUREG/CP—0048-Vol.1, pp 5-22) **EPRI programs in reactor research.** Taylor, J.J. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Safety research and development (R and D) is the largest single R and D effort in the EPRI Nuclear Power Division program. The papers being presented by the EPRI staff and contractors at this Conference represent a sampling of this extensive safety R and D program sponsored by the utilities and including significant co-sponsorship by the Nuclear Regulatory Commission, the Department of Energy, the domestic reactor manufacturers, as well as international organizations. A picture is given of the whole cloth of the EPRI nuclear power program, including the goals and priorities implicit in our program planning, summarizing selected high priority programs in three categories: (1) the consequences of accidents; (2) the mitigation of accidents; and (3) the causes and prevention of failure.

30887 (NUREG/CP—0048-Vol.1, pp 23-60) **General outline of the Italian nuclear regulatory research programs.** Petrangeli, G. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The whole ENEA-Directorate for Nuclear Safety and Health Protection (DISP) research and development activity is focused on the following three main headings: The first one is relative to studies aimed at accident prevention and in particular aimed at preventing nuclear accidents entailing severe core damage. The second one deals with the evaluation and mitigation of severe accident consequences. The third one is relative to probabilistic methodologies development and utilization. The program is described thoroughly in this paper.

30888 (NUREG/CP—0048-Vol.1, pp 61-76) **Status of the IDCOR program.** Reed, C. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The status of the Industry Degraded Core Rulemaking (IDCOR) Program, is presented. The technical strategy, some major insights, and the schedule for release of results are also presented. The final report is to be released in September, 1983.

30889 (NUREG/CP—0048-Vol.1, pp 97-118) **Some salient results of LOBI-MOD1 tests, and programme plans for LOBI-MOD2 facility.** Riebold, W.L.; Addabbo, C.; Piplies, L.; Sanders, J. (Commission of the European Communities, Ispra, Italy; Battelle-Institute, Frankfurt, Germany). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The LOBI research programme is being executed in the Ispra Establishment of the EURATOM Joint Research Centre of the Commission of the European Community in the framework of a research and development contract between the Bundesminister fuer Forschung und Technologie (BMET) of the Federal Republic of Germany and the Commission of the E.C. The objective of the LOBI research programme is to extend the experimental data base for analytical model development and system safety codes verification, and to perform such development and verification work as well as thermohydraulic system analysis. The high pressure, integral system LOBI test facility is a 1:700 scale model of a 1300 MWe pressurized water reactor. The present paper summarizes some salient results of large break loss-of-coolant accident tests per-

formed in the LOBI-MOD1 facility during the period 1980-82. An assessment of some scale- and simulation-dependent phenomena has shown the overall validity of scaling and simulation criteria adopted in the facility design. A short description of the LOBI-MOD2 test facility, the small break loss-of-coolant experimental programme, and the special transients experimental programme concludes the paper.

30890 (NUREG/CP—0048-Vol.1, pp 119-136) **BWR full integral simulation test (FIST) pretest predictions with TRACBO2.** Sutherland, W.A.; Alamgir, M. (General Electric Co., San Jose, CA). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The Full Integral Simulation Test program is a three pronged approach to the development of best-estimate analysis capability for BWR systems. An analytical method development program is underway to extend the BWR-TRAC computer code to model reactor kinetics and major interfacing systems, including balance-of-plant, to improve application modeling flexibility, and to reduce computer running time. An experimental program is underway in a new single bundle system test facility to extend the large break loss-of-coolant accident LOCA data base to small breaks and operational transients. And a method qualification program is underway to test TRACBO2 against experiments in the FIST facility. The recently completed Phase 1 period included a series of LOCA and power transient tests, and successful pretest analysis of the large and small break LOCA tests with TRACBO2. These comparisons demonstrate BWR-TRAC capability for small and large break analysis, and provide detailed understanding of the phenomena.

30891 (NUREG/CP—0048-Vol.1, pp 137-149) **Reflood code development work in JAERI.** Murao, Yoshio; Sugimoto, Jun; Okubo, Tsutomu; Iguchi, Tadashi; Akimoto, Hajime; Okabe, Kazuharu. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

In the safety evaluation of the reflood phase of a pressurized water reactor loss-of-coolant accident, the empirical correlations on the reflood heat transfer and the carry-over rate fraction have been used. The latter is used for calculating the core inlet flooding rate in the system analysis. For obtaining the flexibility of application for safety analysis, a computer code REFLA is being developed for the reflood phase based on the physical understanding of the phenomena. The analytical models are made using experimental data. To investigate the reflood phenomena, the following types of experiments are being performed: (1) small scale reflood test; (2) downcomer simulation test; and (3) large scale reflood test. The purpose of the first two tests is to provide experimental data for developing the best estimate reflood core model. The purpose of the large scale reflood tests is to investigate the integral system behavior, thermo-hydrodynamic behavior in the computers and multi-dimensional thermo-hydrodynamics in a wide core. In order to investigate the scale effect on the system behavior, the test results from the upper plenum test facility in the Federal Republic of Germany are expected to be used.

30892 (NUREG/CP—0048-Vol.1, pp 150-157) **Steam line break, jet pump drive line break and natural circulation tests in ROSA-III program for BWR LOCA/ECCS integral tests.** Tasaka, K.; Suzuki, M.; Anoda, Y.; Nakamura, H.; Shiba, M. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The ROSA-III facility is a volumetrically scaled (1/424) BWR system with an electrically heated core to study the response of BWR and the effectiveness of the ECCS during a LOCA. The core is consisted of four half-length simulated fuel assemblies. Each fuel assembly contains 62 fuel rods and two water rods which are spaced in a square 8 x 8 array. The coolant recirculation system consists of two loops, intact and broken loops, provided with a recirculation pump and two jet pumps in each loop. Jet pumps are installed outside the pressure vessel to simulate the volume and the relative height to the core satisfactorily. Results of five steam line break tests, jet pump drive line break tests, and natural circulation tests are discussed.

30893 (NUREG/CP—0048-Vol.1, pp 158-184) **Computer studies on the influence of some scaling distortions on the results of an intermediate break in LOFT reactor.** Pfau, H.; Sonneck, G. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The scaling problem has two interrelated aspects: (1) scaling of a test apparatus to a commercial PWR; and (2) scaling of the test results to understand the behaviour of a pressurized water reactor because when doing the first scaling task a number of compromises was unavoidable. Concerning the first point a power to volume scaling was chosen for LOFT which must include compromises for the well known reasons. This report is solely concerned with the second aspect. Discussed are the method, the model, parametric studies, base cases and variations for modelling efforts.

30894 (NUREG/CP—0048-Vol.1, pp 185-198) **Integral tests as a tool for the study of physical phenomena and code assessment.** Hicken, E.F.; Wahba, A.B. (Gesellschaft fuer Reaktorsicherheit (GRS) mbH, Garching, Germany). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The necessity of Integral Test Facilities in the framework of reactor safety research is explained using the example of the loss of coolant accident. Tests performed and planned using these facilities amounts to more than 500. Most of them have been used to understand physical phenomena, system behavior and for code assessment. Experimental and analytical efforts are assessed with respect to large, intermediate and small break LOCA's. Cost consideration and its benefit to enhance international cooperation are mentioned. No general assessment can be made if new facilities are required, because a decision may not only rely on technical aspects.

30895 (NUREG/CP—0048-Vol.1, pp 199-208) **Review of flooding experiments with blocked arrays (FEBA) blockage data.** Ogden, D.M. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1). Contract AC07-76ID01570.

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

A major concern relative to the safety of pressurized water reactors during a large break loss-of-coolant accident is the coolability of rod bundles with cooling channel blockages. The influence of size, shape, and distribution of flow channel blockages on emergency core cooling heat transfer is currently the subject of considerable research. The Full Length Emergency Core Cooling Heat Transfer-Separate Effects Tests and System Effects Tests Program, jointly sponsored by the US Nuclear Regulatory Commission, Electric Power Research Institute, and Westinghouse Electric Corporation is examining blockage heat transfer for various blockage shapes, sizes, and configurations. The Slab Core Test Facility of the Japan Atomic Energy Research Institute has examined blockage heat transfer for a single shape and configuration facility with two of the eight bundles blocked. Pacific Northwest Laboratory conducted in-reactor experiments in the National Research Universal reactor, with a 32 rod nuclear fuel rod bundle to examine the heat transfer effects of rod ballooning and rupture. The Flooding Experiments with Blocked Arrays (FEBA) Program, sponsored by the Federal Republic of Germany, conducted experiments with 25 rod electrically heated bundles to examine heat transfer effects of coolant channel blockages and mid-plane spacer grids. All of these experimental programs are contributing significantly to the reflood flow blockage heat transfer data base.

30896 (NUREG/CP—0048-Vol.1, pp 209-232) **COBRA-TF: flow blockage heat transfer program.** Kelly, J.M.; Kohrt, R.J. (Pacific Northwest Lab., Richland, WA). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The COBRA-TF (Coolant Boiling in Rod Arrays-Two Fluid) computer program is being developed at the Pacific Northwest Laboratory by the US NRC to provide a best-estimate LWR hot bundle analysis capability. In particular, this program has two main objectives: (1) develop a hot bundle/hot channel code to predict coupled thermal-hydraulic/rod deformation behavior; and (2) incorporate and assess flow blockage heat transfer models for the reflood phase of a LOCA (loss of coolant accident). Concurrent with this effort, a joint project with the Full Length Emergency Core Cooling Heat Transfer-Separate Effects Tests and System Effects Tests (FLECHT-SEASET) program has been initiated. This cooperative effort between Westinghouse and Battelle will produce a version of COBRA-TF capable of addressing Appendix K concerns about reflood heat transfer wth flow blockages. This program has three distinct phases: (1) assess the ability of COBRA-TF to predict reflood heat transfer in an unblocked rod bundle (FLECHT-SEASET 161 and 21 rod unblocked, FEBA Series I and II); (2) incorporate flow blockage models and assess reflood heat transfer in blocked bundles (FLECHT-SEASET 21 rod blocked, FEBA Series III and IV); and (3) perform quantitative assessment of flow blockage heat transfer capability (with a fixed version of COBRA-TF) for the FLECHT-SEASET 163 rod bundle (blockage islands with bypass).

30897 (NUREG/CP—0048-Vol.1, pp 233-250) **Measurement of grid spacer's enhanced droplet cooling under reflood condition in a PWR by LDA.** Lee, S.L.; Sheen, H.J.; Cho, S.K.; Issapour, I.; Hua, S.Q. (State University of New York, Stony Brook). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Reported is an experiment designed for the measurements of grid spacer's enhanced droplet cooling under reflood condition at elevated temperatures in a steam environment. The flow channel consists of a simulated 1.60m-long pressurized water reactor (PWR) fuel rod bundle of 2 x 2 electrically heated rods. Embedded thermocouples are used to measure the rod cladding temperature at various axial levels and an unshielded Chromel-Alumel thermocouple sheathed by a small Inconel tube is traversed in the center of the subchannel to measure the temperatures of the water and steam coolant phases at various levels. The droplet dynamics across the grid spacer is directly obtained by a special laser-Doppler anemometry technique for the in situ simultaneous measurement of velocity and size of droplets through two observation windows on the test channel, one immediately before and one immediately after the grid spacer. Some results are presented and analyzed.

30898 (NUREG/CP—0048-Vol.1, pp 251-275) **Experimental measurement of axially varying vapor superheats in convective film boiling.** Evans, D.; Webb, S.W.; Chen, J.C. (Lehigh Univ., Bethlehem, PA). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

An experimental technique using slowly propagating critical heat flux (CHF) quench fronts was used to obtain measurements of nonequilibrium flow-film boiling conditions as a function of axial distance from the CHF location. Axial variation of wall superheats was consistent with previous findings indicating a rapid rise in the region close to the quench front, leveling off to a slower and fairly constant rate of rise further downstream. The new findings with respect to the vapor superheat indicated a transition region immediately downstream from CHF where the two-phase fluid remained close to the equilibrium thermodynamic state. It was hypothesized that the liquid requires a finite axial distance to disengage from the faster flowing vapor, and in this disengagement region the volumetric presence of liquid is more significant than heretofore understood. This transition region is hypothesized to have relatively efficient vapor-to-liquid and wall-to-liquid heat transfer. At greater distances, the vapor superheat results indicate a relatively ineffective vapor to liquid heat transfer process. Thus, these experimental findings indicate a zone near the CHF front where the vaporization source intensity is relatively high, followed by a far zone where the source intensity drops off to a relatively low magnitude. If these findings are confirmed by future experiments, phenomenological modeling of the nonequilibrium transfer process in convective film boiling must account for these two regions of behavior.

30899 (NUREG/CP—0048-Vol.1, pp 276-310) **Inverted annular two-phase flow experiments and modeling (phenomenological modeling of two-phase flow in water reactor).** Ishii, M.; De Jarlais, G. (Argonne National Lab., IL). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Among the various two-phase flow regimes, the inverted annular flow in the post CHF regime is relatively less well understood due to its special heat transfer conditions. However, this regime is quite important in terms of LWR accident analyses, since the peak cladding temperature often strongly depends on the thermal-hydraulics in this inverted annular flow and subsequent droplet dispersed flow. In view of this, the inverted annular flow is studied in detail both analytically and experimentally. The summary of these results are presented here.

30900 (NUREG/CP—0048-Vol.1, pp 311-334) **Heat transfer and fluid dynamics under simulated degraded core conditions.** Dhir, V.K.; Tung, V.X.; Marshall, J.; Catton, I.; Tsai, F.P.; Lee, H. (Univ. of California, Los Angeles). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

In this paper the work conducted at the University of California, Los Angeles, in the area of hydrodynamic and thermal characteristics of simulated core debris has been reviewed. The study was supported by the US NRC and EPRI. The work has been applied to two hypothetical degraded core accidents in light water rectors. In one scenario the flow is reestablished from below while in the other a complete blockage is assumed to form at inlet thus allowing flow only from top. In applying the model the decay heat in the particles and the energy released as a result of Zircaloy-water reaction are accounted for. The results indicate that for certain size particles and initial temperatures, the accident may continue to progress despite initiation of some water supply to reactor vessel.

30901 (NUREG/CP—0048-Vol.1, pp 335-366) **Modelling of simulated clad ballooning blockages in the THETIS Rig at AEE Winfrith.** Fell, J.; Shires, G.L.; Pearson, K.G.; Cooper, C.A. (Atomic Energy Establishment, Winfrith, England). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

This paper summarizes the first phase of a programme of experimental work on the THETIS Rig at AEE Winfrith to investigate the thermal-hydraulic conditions in a severe coplanar clad ballooning configuration under conditions of forced and gravity reflood. A major objective was to understand the thermal hydraulic processes which determine the limits of coolability for such a blockage but considerable effort was expended both in the detailed design of the test section and the instrumentation to ensure that the experiments would also provide high quality data for computer code validation. A considerable programme of work on the topic of clad ballooning has been carried out in the UK. This identifies the double-ended cold leg break as the only loss of coolant accident scenario in which there is a significant risk of impaired cooling due to clad ballooning. A necessary input to the assessment of the effect of clad ballooning on core coolability is an understanding of heat transfer processes in the presence of a blockage. The THETIS tests were intended to provide this.

30902 (NUREG/CP—0048-Vol.1, pp 367-379) **Italian research on steam generator performance under accident conditions.** Palazzi, G. (ENEA, Rome, Italy). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The purpose of this paper is to provide an overview of the principal Italian activities concerning the behavior of pressurized water reactor U-tube steam generators under accident conditions. Facilities and results to date are described for the following: (1) GEN 3 x 3 Test on steam generator thermalhydraulics; (2) FREGENE, a freon-water test section; and (3) GEST-GEN steam generator performance investigations.

30903 (NUREG/CP—0048-Vol.1, pp 380-389) **Steam separators development: experimental programs from screening to actual environment tests.** Avitabile, M.; Capuano, G.; Pitimada, D.; Sala, M. (ENEA-TERM, Rome, Italy; ANSALDO DBGV, Milan, Italy). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The Italian program for developing and testing steam separators for nuclear plants is presented. This program is carried out in the frame of a research agreement between ENEA and ANSALDO DBGV S.p.A. The experimental activity includes: (1) small scale experiments intended to obtain first screening of steam separators geometry: these experiments are carried out in air-water facility (L.AR.A). Results are merely qualitative; (2) full scale experiments carried out in air water facility (ARAMIS). These experiments are intended to obtain quantitative results concerning carryover, carryunder, efficiency, pressure drops; and (3) full scale tests intended to qualify both new designed and licensee models of steam separators. Tests will be carried out in Gest-Sep facility operating at the actual reactor conditions. This paper contains: LARA loop presentation, ARAMIS loop presentation, GEST-SEP loop presentation, some scaling criteria utilized to choice the air-water operatng parameters, and examples of results obtained in air water small scale experiments.

30904 (NUREG/CP—0048-Vol.1, pp 390-401) **Reflooding of a PWR bundle: effect of spacer grids.** Veteau, J.M.; Clement, P.; Deruaz, R. (Centre d'Etudes Nucleaires de Grenoble, France). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Spacers located along the cladding of fuel rods influence the cooling efficiency in comparison with results obtained on smooth surfaces like tubes. Heat transfer in the dry region is increased at the level and downstream of spacer grids due to turbulence, acceleration of the flow, possible breakup of the entrained droplets and cooling fin effect of the grid itself. Quench front propagation is expected to be accelerated, at least at the location of the grids, which have a low thermal inertia and no internal heat source. In order to obtain experimental data about the effects of spacer grids, experiments were performed with a 6 x 6 rod bundle on ERSEC loop. The geometry of the bundle is the same as for a 17 x 17 PWR assembly (outer rod diameter 9.5 mm, square pitch 12.6 mm) maintained by 7 spacer grids. The selected approach consisted of performing reflood experiments with different kinds of spacer grids.

30905 (NUREG/CP—0048-Vol.1, pp 402-427) **Reflooding of a PWR bundle: Pericles programme and first results.** Veteau, J.M.; Clement, P.; Deruaz, R. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Pericles programme aims at studying the thermohydraulics of a pressurized water reactor core during emergency core cooling, in case of large as well as small breaks. To meet this objective, Pericles facility which is capable of withstanding pressures up to 70 bar and can be equipped with either a cylindrical or a rectangular test section was built. The cylindrical test section will consist of a 368 heater rod bundle, full length, 17 x 17 geometry, together with 25 thimble tubes, and will be used from 1984 to mainly investigate core thermohydraulics in case of small breaks. The rectangular one, in operation since mid 1982, is composed of 357 heater rods which are arranged in three 7 x 17 assemblies, and is devoted to the study of two-dimensional phenomena in the core.

30906 (NUREG/CP—0048-Vol.1, pp 428-448) **Omega tests: blowdown of a 36 rod bundle.** Chauliac, C. (Centre d'Etudes Nucleaires de Grenoble, France). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The blowdown period of a loss-of-coolant accident is investigated on the Omega loop which is a separate effect experiment simulating a part of the core of a pressurized water reactor. The objective of the Omega experimental program is to provide data about heat transfer coefficients during blowdown. Results will be used for the adjustment of French best estimate code CATHARE. The experiments are performed with single tube (uniform axial heat flux profile) and rod bundle (axial cosine flux) electrically heated test sections. This paper presents results obtained in rod bundle geometry and studies the effect on blowdown of such parameters as: ratio of the break sizes, heat flux, total areas of the breaks. Pressure, void fraction, flow rate and wall temperature transients are compared when one parameter varies.

30907 (NUREG/CP—0048-Vol.1, pp 449-466) **Patricia steam generator tests.** de Crecy, F.; Roumy, R. (Centre d'Etudes Nucleaires de Grenoble, France). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The Patricia GV program is a joint program of CEA, French utilities, and FRAMATOME. It aims at a better knowledge of the pressurized water reactor steam generator behavior under small break loss of coolant accident conditions. It has two parts: Patricia GV1 deals with the primary side of the steam generator and is presently completed. Patricia GV2 deals with the secondary side dry-out phenomenon and is still in progress. Objectives, test facilities, test procedures, and results of the program are discussed.

30908 (NUREG/CP—0048-Vol.1, pp 467-498) **Hydrodynamic load measurements during safety/relief valve actuation at Kuosheng Plant.** Lee, S.K.; Hsiau, H.N.; Chen, Y.T. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Kuosheng Nuclear Power Station Units 1 and 2 are General Electric Company (GE) BWR6/MK III plants. Subsequent to the initiation and development of the Kuosheng design, a large worldwide research and development effort to examine the phenomenon associated with safety/relief valve actuation and loss-of-coolant accident blowdown was undertaken. This research effort revealed several new structural and equipment loading conditions which were not considered in the original Kuosheng design. Therefore a program of New Loads Adequacy Evaluation was conducted by Bechtel Power Corporation to evaluate the effects of these new loads on the Kuosheng design. In this paper, the test program, test instrumentation, and the test results from the Kuosheng SRV discharge test are described.

30909 (NUREG/CP—0048-Vol.1, pp 499-566) **Light water reactor safety research trends at EPRI.** Loewenstein, W.B.; Sehgal, B.R. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

An active multifaceted research and development (R and D) program in light water reactor (LWR) safety has been pursued for a number of years by the Nuclear Power Division at Electric

Power Research Institute (EPRI). The overall objectives have remained the same since the initiation of the program, namely, the quantification of the safety margins and the assurance of the reliability of the nuclear power plants. The trends of the LWR safety research at EPRI have evolved with the evolving safety concerns; certain research areas have received and are receiving increased attention. These are (1) fission product source term, (2) hydrogen combustion and control, (3) dynamic piping response, (4) soil-structure interaction, (5) pipe rupture (leak-before-break), (6) containment integrity and failure modes, (7) plant safety control (operator-aids), (8) secondary side (steam-generator) behavior, (9) pressurized thermal shock, (10) safety relief valve behavior, (11) common-cause failures, (12) human and plant reliability, (13) confidence in probabilistic risk analysis (PRA) results, (14) integrated safety analysis and, most recently, and (15) seismology and its effect on plant seismic design requirements. The EPRI-sponsored work in each of these areas are briefly described in the text.

30910 (NUREG/CP—0048-Vol.1, pp 567-587) **EPRI research and application efforts on reactor vessel pressurized thermal shock.** Chexal, B.; Marston, T.; Sun, B. (Electric Power Research Inst., Palo Alto, CA). Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The Electric Power Research Institute (EPRI) has supported research on reactor vessel integrity for a number of years and has supported an extensive effort on reactor vessel pressurized thermal shock (PTS) over the last three years. In addition, EPRI has developed a linked set of computer codes to simulate the pressurized thermal shock transients and assess the integrity of the nuclear reactor vessels for various overcooling transients. The pressurized thermal shock issue is being addressed at EPRI using matrix management to coordinate and apply the program results. In its program, EPRI is: (1) developing the capability to predict reactor vessel wall transient temperatures; (2) developing the capability to determine vessel wall radiation exposure; (3) developing the capability to determine reactor vessel toughness; (4) developing a linked set of analytical codes for utilities or their contractors to assess the effects of reactor vessel thermal shock; (5) investigating ways to extend reactor vessel life; and (6) transferring these technologies to utilities to help build their in-house capabilities. Highlights of current developments from this program are discussed.

30911 (NUREG/CP—0048-Vol.1, pp 588-604) **EPRI sponsored TMI-2 research program.** Roberts, J.T.A. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The Joint Information and Examination Program at TMI-2 was officially started in March 1980 with the signing of the GEND Coordination Agreement among General Public Utilities Service Corporation, EPRI, NRC, and DOE. Planning that started in 1979 continued during 1980 to develop an R and D program which would respond to both the TMI-2 recovery effort and the general needs of the LWR nuclear industry. Experts from government laboratories, utilities, vendors, and academia had participated in a number of expert planning groups that produced recommendations on research and development for the joint program. EPRI accepted responsibility for the planning and the primary R and D funding to support reactor coolant-system and auxiliary-system decontamination and dose reduction, mechanical component survivability, and primary-system pressure-boundary characterization. The scope of research being conducted by EPRI in support of TMI-2 Recovery is illustrated by examples of recent accomplishments.

30912 (NUREG/CP—0048-Vol.1, pp 605-651) **EPRI source term research.** Oehlberg, R.N.; Merilo, M.; Rahn, F.; Sehgal, B.R.; Squarer, D.; Vogel, R.C. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

There is currently concern that the use of so-called conservative or erroneously large predictions of the consequences of accidents may lead to a counterproductive overreaction in emergency response planning and certainly an unnecessarily negative public perception of the potential outcome of a reactor accident. It is now the objective, of both the governmental and the industrial components of the reactor safety community, to perform realistic accident evaluations as contrasted to the previous conservative evaluations. This is, of course, just a return to the traditional engineering practice of applying the safety factor to the end result. There are very good reasons to believe that the source term is appreciably overstated. It is our objective to clearly define the source term and substantiate realistic evaluations through acquisition of additional data. In this paper the more significant aspects of the EPRI source term program is outlined.

30913 (NUREG/CP—0048-Vol.1, pp 652-667) **Recent observations of cracks in large diameter BWR piping: analysis and remedial actions.** Danko, J.C. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Since the introduction of the first commercial boiling water reactor (BWR), incidents of intergranular stress corrosion cracking (IGSCC) in the weld-heat-affected zones of austenitic stainless steel piping have occurred. Early incidents of pipe cracking were confined to small-diameter lines of 100 mm (4 inch) or less. In time, larger diameter lines were also subject to the phenomenon of IGSCC and in 1978 the first incident in a 610-mm (24-inch) 304 stainless steel pipe of the Gundremmingen BWR Block A was reported. This plant, a BWR model 1, had been in operation since 1967 and was one of the older operating units. Further incidents of cracking in pipes greater than 508 mm (20 inch) in diameter did not occur until 1982. Subsequently, a number of other boiling water reactors reported incidents in large-diameter lines. The purpose of this paper is to review these recent incidents and the remedial actions taken by the utility industry.

30914 (NUREG/CP—0048-Vol.1, pp 668-709) **Thermal-hydraulic analysis of steam generators: the ATHOS code.** Srikantiah, G.S.; Kalra, S.P. Jan 1984. NTIS MF A01 - GPO* $12.00. Order Number TI84900510. (CONF-8310143—Vol.1).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

To address the needs of the Nuclear Power Industry for the evaluation of design and performance analysis of steam generators, a computer program capable of three-dimensional thermal-hydraulic analysis of different types of steam generators has been developed. This computer program, called ATHOS (Analysis of the Thermal Hydraulics of Steam Generators), is capable of simulating the geometry and internal structure, including tube bundle, tube support plates, baffles, etc. in considerable detail. The thermal hydraulics simulation is based on a description of the two-phase flow by means of a set of partial differential equations representing thermal equilibrium flow with slip between the two phases. An implicit numerical method is used to solve the set of finite difference equations derived from the governing partial difference equations using a set of constitutive models for slip, friction and heat transfer which will be described in detail in subsequent sections of this paper. The results of this solution include detailed distributions of the velocities of the two phases in R-O-Z coordinates, void fractions and enthalpies. In this paper the governing equations, the constitutive models, the assumptions, the solution procedure, typical calculation and result, and code verification studies are described.

30915 (NUREG/CP—0048-Vol.6) **Proceedings of the eleventh water reactor safety research information meeting. Volume 6.** Szawlewicz, S.A. (comp.). (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research). Jan 1984. 204p. (CONF-8310143—Vol.6). NTIS, PC A10/MF A01 - GPO*. Order Number DE84900650.

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Portions are illegible in microfiche products.

Separate abstracts were prepared for papers presented in the following areas of interest: (1) Human Factors Research; (2) Safeguards Research; (3) Emergency Preparedness; (4) Process Control; and (5) Occupational Radiation Protection.

30916 (NUREG/CP—0048-Vol.6, pp 1-7) **Development of slim-maud: a multi-attribute utility approach to human reliability evaluation.** Embrey, D.E. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

This paper describes further work on the Success Likelihood Index Methodology (SLIM), a procedure for quantitatively evaluating human reliability in nuclear power plants and other systems. SLIM was originally developed by Human Reliability Associates during an earlier contract with Brookhaven National Laboratory (BNL). A further development of SLIM, SLIM-MAUD (Multi-Attribute Utility Decomposition) is also described. This is an extension of the original approach using an interactive, computer-based system. All of the work described in this report was supported by the Human Factors and Safeguards Branch of the US Nuclear Regulatory Commission.

30917 (NUREG/CP—0048-Vol.6, pp 8-16) **Estimation of human error probabilities from expert judgement for use in probabilistic risk assessment of nuclear power plants.** Weston, L.M. (Sandia National Labs., Albuquerque, NM). Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6). Contract AC04-76DP00789.

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

A human reliability research program that is sponsored by the Nuclear Regulatory Commission (NRC) is being performed by Sandia National Laboratories (SNL) and SNL contractors. Primary objectives of the program are to develop human performance models, human reliability analysis (HRA) methods, and estimates of human error probabilities (HEPs) for nuclear power plant (NPP) tasks. This information is needed to perform HRAs in probabilistic risk assessments (PRAs) of NPPs. The human reliability research program is being funded by the Office of Nuclear Regulatory Research and managed by the Division of Facility Operations.

30918 (NUREG/CP—0048-Vol.6, pp 17-27) **Maintenance personnel performance simulation (MAPPS): a model for predicting maintenance performance reliability in nuclear power plants.** Knee, H.E.; Krois, P.A.; Haas, P.M.; Siegel, A.I.; Ryan, T.G. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

It has become increasingly recognized that human error contributes to the overall risk in the operation of nuclear power plants (NPPs). Human reliability is an integral part of assessment of man-machine interfaces including the many varied activities comprising the maintenance function. Human errors within maintenance tasks contribute to plant risk, and it is important to ensure that the diagnosis and improvement of maintenance performance reliability is carried out in a systematic manner. The US Nuclear Regulatory Commission (NRC) has recognized the utility of a structured methodology for providing quantitative maintenance personnel performance reliability data as input to probabilistic risk assessment (PRA) studies. Specifically, the NRC through the Oak Ridge National Laboratory (ORNL) in association with Applied Psychological Services, Inc. (APS), has developed a structured, quantitative, predictive methodology in the form of a computerized simulation model for assessing maintainer task performance. The primary objective of the overall program is to develop, validate, and disseminate a practical, useful, and acceptable methodology for the quantitative assessment of NPP maintenance personnel reliability.

30919 (NUREG/CP—0048-Vol.6, pp 28-35) **Concept development of the human reliability data bank.** Miller, D.P. (Sandia National Labs., Albuquerque, NM). Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6). Contract AC04-76DP00789.

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The US Nuclear Regulatory Commission and Sandia National Laboratories initiated a three-phased research program in 1981 to develop a plan for a human reliability data bank. This research initiative was in response to the data needs of the nuclear power industry's probabilistic risk assessment community. The three phases are: (1) develop the data bank concept; (2) develop an implementation plan and conduct a feasibility test; and (3) assist the sponsor in implementing the data bank. This paper briefly describes some of the results of the work performed during Phase A and outlines the program elements schedules for Phase B.

30920 (NUREG/CP—0048-Vol.6, pp 204) **Nuclear power safety reporting system feasibility analysis and concept description.** Finlayson, F.C.; Ims, J.R.; Hussman, T.A. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The Aerospace Corporation is assisting the US Nuclear Regulatory Commission (NRC) in the evaluation of the potential attributes of a voluntary, nonpunitive data gathering system for identifying and quantifying the factors that contribute to the occurrence of significant safety problems involving humans in nuclear power plants. The objectives of the Aerospace Administration (FAA)/National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS) in order to determine whether it would be feasible to apply part (or all) of the ASRS concepts for collecting data on human factor related incidents to the nuclear industry; and (2) to identify and define the basic elements and requirements of a Nuclear Power Safety Reporting System (NPSRS), assuming the feasibility of implementing such a system was established.

30921 (NUREG/CP—0048-Vol.6, pp 42-50) **Fault diagnosis using artificial intelligence.** Bray, M.A. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6). Contract AC07-76ID01570.

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

An experiment was performed during 1983 that measured performance of nuclear plant operators with and without a computer-based operator aid. This paper discusses the results of that experiment and implications for design and regulation of advanced computer aids in nuclear control rooms.

30922 (NUREG/CP—0048-Vol.6, pp 51-58) **Reactor vital equipment determination techniques.** Bott, T.F.; Thomas, W.S. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The Reactor Vital Equipment Determination Techniques program at the Los Alamos National Laboratory is discussed. The purpose of the program is to provide the Nuclear Regulatory Commission (NRC) with technical support in identifying vital areas at nuclear power plants using a fault-tree technique. A reexamination of some system modeling assumptions is being performed for the Vital Area Analysis Program. A short description of the vital area analysis and supporting research on modeling assumptions is presented. Perceptions of program modifications based on the research are outlined, and the status of high-priority research topics is discussed.

30923 (NUREG/CP—0048-Vol.6, pp 59-73) **Measuring radioiodine in the environment after a nuclear power plant accident.** McGuire, S.A.; Huchton, R.L.; Motes, B.G. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Following an accident at a light water reactor, the radioiodines are potentially the most significant radiological threat to the health of the surrounding populace. Thus, rapid and simple monitoring methods are required to accurately quantify radioiodine contributions to the population dose. Support provided to the NRC by Exxon Nuclear Idaho Company, Inc., (ENICO) of the Idaho National Engineering Laboratory (INEL) has been directed to the development of emergency response monitoring methods. Specifically entailed was the evaluation of techniques for determining radioiodine exposure through two predominate pathways: inhalation of the airborne radioactivity during cloud passage and ingestion of deposited activity introduced into the human food chain via the grass-cow-milk pathway.

30924 (NUREG/CP—0048-Vol.6, pp 82-87) **Evaluation of nuclear facility decommissioning projects program.** Baumann, B.L. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

The objective of the Evaluation of Nuclear Facility Decommissioning Projects (ENFDP) program is to provide the NRC licensing staff with data which will allow an assessment of radiation exposure during decommissioning and the implementation of ALARA techniques. The data will also provide information to determine the funding level necessary to ensure timely and safe decommissioning operations. More specifically, it is planned to (1) compare actual decommissioning costs, methods and radiation exposures with those estimated by the Battelle-PNL and ORNL NUREGs on decommissioning; (2) determine how effectively exposure reduction techniques can be applied to decommissioning activities to meet ALARA objectives; and (3) evaluate the lessons learned concerning various decommissioning methods. The work necessary to achieve this objective has been divided into the following four tasks: (1) identification of failicites; (2) data collection; (3) analysis and reporting; and (4) summary comparisons.

30925 (NUREG/CP—0048-Vol.6, pp 88-101) **Overview of decontamination as a precursor to decommissioning.** Divine, J.R.; Woodruff, E.M.; Munson, L.F. Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Decontamination of operating reactors has long been a subject of discussion, research, and development. This area continues to be pertinent today because of increasing occupational exposure. The magnitude of radiation fields in operating reactors indicates the need for decontamination as a precursor to decommissioning. In decommissioning a reactor, the operator has several options which may or may not include decontamination. Indeed, decontamination is justified only if one or more of the following criteria are met: (1) the net occupational exposure is less with a decontamination step; (2) the net volume of waste that goes to a radioactive waste site is lower with decontamination; or (3) it is not feasible to put the site in storage for a sufficiently long period to allow the radioactivity to decay to a sufficient degree. Because of the probable need for decontamination, the USNRC requested the Pacific Northwest Laboratory to conduct a program to review decontamination as a precursor to decommissioning. The emphasis of the program was to determine its effects on occupational exposure and on waste volume reduction.

30926 (NUREG/CP—0048-Vol.6, pp 124-139) **Analysis of measurements with personnel dosimeters and portable instruments for determining neutron dose equivalent at nuclear power plants.** Eisenhauer, C.M.; Schwartz, R.B. (National Bureau of Standards, Washington, DC). Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

This paper consists of exerpts from a report prepared for the Division of Facility Operations, Office of Nuclear Regulatory Research of the Nuclear Regulatory Commission. The report discusses an analysis of two series of measurements of neutron spectra and responses of neutron personnel monitoring instruments in containment at nuclear power plants. The report concludes that, in view of the fact that no one technique is clearly superior, it is wise to retain devices that can be worn or carried by a worker as well as those that can be used to measure dose equivalents in various areas. Continued use of thermoluminescent albedo dosimeters as neutron personnel dosimeters and calibration techniques are recommended.

30927 (NUREG/CP—0048-Vol.6, pp 140-147) **Preliminary results of testing bioassay analytical performance standards.** Fisher, D.R.; Robinson, A.V.; Hadley, R.T. (Pacific Northwest Lab., Richland, WA). Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6). Contract AC06-76RL01830.

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Bioassay is required (10 CFR, Part 20) for determining a worker's exposure to radioactive material. Bioassay involves excreta analysis and in-vito counting for determining levels of internally deposited radionuclides. Protection of workers depends upon accurate determination of internal exposures from incorporated radionuclides. The Nuclear Regulatory Commission, in cooperation with the US Department of Energy, established a study to evaluate the appropriateness of the draft ANSI Standard by conducting a two-round, nationwide bioassay intercomparison test. This paper presents preliminary results of the first round of testing. The analytical performance of both in-vivo and in vitro bioassay laboratories is being studied to determine the capability of these laboratories to meet the minimum criteria for accuracy and precision specified in the draft Standard.

30928 (NUREG/CP—0048-Vol.6, pp 148-160) **Considerations in factoring occupational dose into value-impact and cost-benefit analyses.** Cohen, J.J.; Horton, W.H.; Lobner, P.R.; Smith, C.F.; Tinney, J.F. (Science Applications, Inc., Pleasanton, CA). Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

An area of growing concern in recent years has been the apparent increase in levels of collective radiation dose to workers at nuclear power plants in the USA. NRC decisions and rulings related to in-service inspection, retrofits, and plant upgrades have been primarily intended to reduce the risk of public radiation exposure resulting from either routine release of radioactivity or potential accident situations. However, implementation of the required control measures and procedures can often result in increased levels of occupational radiation exposure. Recognizing the need to incorporate occupational dose into probabilistic risk assessments (PRA), value-impact, and cost-benefit analyses related to public safety, the NRC has sponsored this study with the objective of developing an appropriate methodology to factor potential worker exposures into safety assessments.

30929 (NUREG/CP—0048-Vol.6, pp 180-197) **Decontamination impacts on waste management and disposal.** Davis, M.S. (Brookhaven National Lab., Upton, NY). Jan 1984. NTIS, PC A10/MF A01 - GPO*. Order Number TI84900650. (CONF-8310143—Vol.6).

From 11. NRC water reactor safety research information meeting; Gaithersburg, MD, USA (14 Oct 1983).

Chemical decontamination of the primary system is being proposed as a means of reducing occupational exposure and insuring the continued safe operation of light water reactors. The Nuclear Regulatory Commission (NRC) is concerned with evaluating the effectiveness and safety of chemical decontamination processes. The major areas of concern are: the compatibility of the chemical system with the primary system materials, the long term stability of the primary system following one or more decontaminations, the

rate of radioactive recontamiation, the type, volume and toxicity level of the radwaste streams generated by the decontamination and their subsequent management at the plant and at the disposal site. In addition to an evaluation of the subsequent radiation reduction during normal operations, the NRC will need assurance that a proposed decontamination method is acceptable in terms of the added occupational exposure incurred during the decontamination and during subsequent waste handling. The NRC sponsors a program at Brookhaven National Laboratory (BNL) whose primary objective is to determine if chemical decontamination wastes can be treated at the plant in a manner that will mitigate the potential hazards associated with disposal of these wastes. This includes an assessment of the occupational hazards. Any method used for processing decontamination wastes should be safe with respect to the potential for increased exposure.

30930 **(NUREG/CR—2679-Vol.24) Advanced reactor safety research quarterly report, October-December 1982. Volume 24.** (Sandia National Labs., Albuquerque, NM (USA)). Apr 1984. Contract AC04-76DP00789. 209p. (SAND—82-0904-Vol.24). NTIS, PC A10/MF A01 - GPO; GPO Dep. Order Number DE84012852.

This report describes progress in a number of activities dealing with current safety issues relevant to both light water reactors (LWRs) and breeder reactors. The work includes a broad range of experiments to simulate accidental conditions to provide the required data base to understand important accident sequences and to serve as a basis for development and verification of the complex computer simulation models and codes used in accident analysis and licensing reviews. Such a program must include the development of analytical models, verified by experiment, which can be used to predict reactor and safety system performance under a broad variety of abnormal conditions. Current major emphasis is focused on providing information to NRC relevant to (1) its deliberations and decisions dealing with severe LWR accidents and (2) its safety evaluation of the proposed Clinch River Breeder Reactor.

30931 **(NUREG/CR—3307-Vol.4) Reactor safety research programs. Quarterly report, October-December 1983. Vol. 4.** Edler, S.K. (ed.). (Pacific Northwest Lab., Richland, WA (USA)). May 1984. Contract AC06-76RL01830. 36p. (PNL—4705-4). NTIS, PC A03/MF A01 - GPO $3.75; GPO Dep. Order Number DE84013529.

Evaluations of nondestructive examination (NDE) techniques and instrumentation include investigating the feasibility of detecting and analyzing flaw growth in reactor pressure boundary systems and examining NDE reliability and probabilistic fracture mechanics. Accelerated pellet-cladding interaction modeling is being conducted to predict the probability of fuel rod failure under normal operating conditions. Experimental data and analytical models are being provided to aid in decision making regarding pipe-to-pipe impacts following postulated breaks in high-energy fluid system piping. Experimental data and validated models are being used to determine a method for evaluating the acceptance of welded or weld-repaired stainless steel piping. Thermal-hydraulic models are being developed to provide better digital codes to compute the behavior of full-scale reactor systems under postulated accident conditions. High-temperature materials property tests are being conducted to provide data on severe core damage fuel behavior. Severe fuel damage accident tests are being conducted at the NRU reactor, Chalk River, Canada; an instrumented fuel assembly irradiation program is being performed at Halden, Norway; and fuel assemblies and analytical support are being provided for experimental programs at the Power Burst Facility.

30932 **(NUREG/CR—3329-Vol.4) Thermal/hydraulic analysis research program quarterly report, October-December 1983. Volume 4.** Thompson, S.L. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1984. Contract AC04-76DP00789. 64p. (SAND—83-1171-Vol.4). NTIS, PC A04/MF A01; 1 - GPO; GPO Dep. Order Number DE84011478.

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The TRAC-PF1/MOD1 independent assessment program is part of a multi-faceted effort to determine the ability of various systems codes to predict the detailed thermal/hydraulic response of LWRs during accident and off-normal conditions. This program is a successor to the RELAP5/MOD1 independent assessment project underway at Sandia for the last two years. This quarter also ends the RELAP5/MOD1 independent assessment project with the completion of the last analyses scheduled (i.e., the Semiscale S-UT-8 small break transient analysis).

30933 **(NUREG/CR—3518-Vol.1) SLIM-MAUD: an approach to assessing human error probabilities using structured expert judgment. Volume I. Overview of SLIM-MAUD.** Embrey, D.E.; Humphreys, P.; Rosa, E.A.; Kirwan, B.; Rea, K. (Brookhaven National Lab., Upton, NY (USA)). Mar 1984. Contract AC02-76CH00016. 36p. (BNL-NUREG—51716-Vol.1). NTIS, PC A03/MF A01; 1 - GPO; GPO Dep. Order Number DE84012380.

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This two-volume report presents the procedures and analyses performed in developing an approach for structuring expert judgments to estimate human error probabilities. Volume I presents an overview of work performed in developing the approach: SLIM-MAUD (Success Likelihood Index Methodology, implemented through the use of an interactive computer program called MAUD - Multi-Attribute Utility Decomposition).

30934 **(NUREG/CR—3547) SETS user's manual for accident sequence analysis.** Stack, D.W. (Sandia National Labs., Albuquerque, NM (USA)). Jan 1984. Contract AC04-76DP00789. 164p. (SAND—83-2238). NTIS, PC A08/MF A01; 1 - GPO; GPO Dep. Order Number DE84009019.

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This manual describes the use of the Set Equation Transformation System (SETS) to perform the accident sequence analysis portion of a probabilistic risk assessment (PRA) for a nuclear power plant. Other tasks in a PRA provide the input to the accident sequence analysis task. The SETS computer program is used to process these inputs to identify the dominant failure modes and to compute an approximate frequency of occurrence for an accident sequence. The use of SETS for each step in an accident sequence analysis is described and an example SETS user program is provided for each step.

30935 **(NUREG/CR—3608) RELAP5 assessment: LOFT large break L2-5.** Thompson, S.L.; Kmetyk, L.N. (Sandia National Labs., Albuquerque, NM (USA)). Feb 1984. Contract AC04-76DP00789. 111p. (SAND—83-2549). NTIS, PC E05/MF A01; 1 - GPO; GPO Dep. Order Number DE84011863.

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RELAP5 is part of an effort to determine the ability of various systems codes to predict the detailed thermal/hydraulic response of LWRs during accident and off-normal conditions. The RELAP5 code is being assessed at SNLA against test data from various integral and separate effects test facilities. As part of this assessment matrix, a large break transient performed at the LOFT facility has been analyzed. The results show that RELAP5/MOD1 correctly calculates many of the major system variables (i.e., pressure, break flows, peak clad temperature) early in a large break LOCA. The major problems encountered in the analyses were incorrect pump coastdown and loop seal clearing early in the calculation, excessive pump speedup later in the transient (probably due to too much condensation-induced pressure drop at the ECC injection point), and excess ECC bypass calculated throughout the later portions of the test; only the latter problem significantly affected the overall results. This excess ECC bypass through the downcomer and vessel-side break resulted in too-large late-time break flows and high system pressure due to prolonged choked flow conditions. It also resulted in a second core heatup being calculated after the accumulator emptied, since water was not being retained in the vessel. Analogous calculations with a split-downcomer nodalization delivered some ECC water to the lower plenum, which was then swept up the core and upper plenum and out the other (pump-side) break; thus no significant differences in long-term overall behavior were evident between the calculations.

30936 **(NUREG/CR—3627) FRANTIC II: applications to standby safety systems.** Ginzburg, T.; Boccio, J.L.; Hall, R.E. (Brookhaven National Lab., Upton, NY (USA)). Dec 1983. Contract AC02-76CH00016. 298p. (BNL-NUREG—51738). NTIS, PC A13/MF A01; 1 - GPO; GPO Dep. Order Number DE84009923.

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This report demonstrates the capability of FRANTIC II to evaluate the standby safety system unavailability on a more realistic basis and perform a detailed examination of periodic testing policies. Once the requisite input parameters to FRANTIC have been described and interpreted, and estimates made from the available data, the code is applied to the three systems: emergency feedwater system (PWR), automatic depressurization system (BWR), and high pressure coolant injection system (BWR). The analysis includes system description, fault tree quantification, unavailability calculation, and error propagation evaluation. Current test policies are also addressed. In each case, emphasis is placed on those features specific to time-dependent unavailability analysis which makes it more suitable than the traditional approaches, based on mean estimates, for analyzing all aspects of reliability associated with standby safety systems. Conclusions are drawn and recommendations are made on strategies to decrease system unavailabilities of the selected real systems. In addition, suggestions are made on how to optimize gathering plant reliability data.

30937 **(NUREG/CR—3653) Containment analysis techniques: a state-of-the-art summary. Final report.** Greimann, L.; Fanous, F.; Bluhm, D. (Sandia National Labs., Albuquerque, NM (USA); Ames Lab., IA (USA)). Mar 1984. Contract AC04-76DP00789. 165p. (SAND—83-7463). NTIS, PC A08/MF A01; 1 - GPO; GPO Dep. Order Number DE84012929.

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The purpose of the work contained herein is to review the state-of-the-art for the analysis of LWR nuclear containments with uniform internal pressure. This includes a review of calculated static failure pressure of various containments, a review of the different failure criteria used for predicting containment failure, and comments on possible uncertainties associated with analysis techniques, material and geometric models, and other analysis features. A state-of-the-art containment analysis is a finite element solution of an axisymmetric model. Material and geometric nonlinearities are included. Nonsymmetric features may be analyzed on an individual basis but are omitted in the axisymmetric model. State-of-the-art models of the material constitutive relationships are used. Deformation predictions are generally regarded as reliable, assuming the containment configuration is accurately described, e.g., known geometry, material and loads. Predictions of leakage are much more uncertain. There is no general agreement on when and where leakage will occur.

30938 **(NUREG/CR—3669) Plutonium Recycle Test Reactor (PRTR) accident. A final report on the investigation of fission product chemical forms.** Hensley, W.K.; Rogers, L.A. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76RL01830. 47p. (PNL—5003). NTIS, PC A03/MF A01; 1 - GPO $4.00; GPO Dep. Order Number DE84011864.

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In September of 1965, an intentionally defective fuel rod failed in the Plutonium Recycle Test Reactor (PRTR), causing the rupture of the surrounding pressure tube and the release of superheated cooling water into a region of the reactor core. The Pacific Northwest Laboratory (PNL) has reviewed the PRTR incident to assemble and update all the available information regarding the incident. A principal goal of the review was to analyze any remaining clues that may indicate the stoichiometry or most probable chemical and physical forms of the released fission products. The review confirmed the role of water in limiting iodine release. About 97% of the iodine released during the accident was subsequently found in tanks containing the reactor/rupture-loop coolant. Although the chemical form of the released radioiodine cannot be stated unambiguously, the available evidence suggests that it was released in the form of cesium iodide. Most of the remaining 3% was found in the condensate collected from air cooling systems. The chemical form of this scrubbed iodine remains undefined.

30939 **(NUREG/CR—3673) Economic risks of nuclear power reactor accidents.** Burke, R.P.; Aldrich, D.C. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1984. Contract AC04-76DP00789. 253p. (SAND—84-0178). NTIS, PC A12/MF A01; 1 - GPO; GPO Dep. Order Number DE84012735.

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Models to be used for analyses of economic risks from events which occur during US LWR plant operation are developed in this study. The models include capabilities to estimate both onsite and offsite costs of LWR events ranging from routine plant forced outages to severe core-melt accidents resulting in large releases of radioactive material to the environment. The models have been developed for potential use by both the nuclear power industry and regulatory agencies in cost/benefit analyses for decision-making purposes. The new onsite cost models estimate societal losses from power production cost increases, plant capital losses, plant decontamination costs, and plant repair costs which may be incurred after LWR operational events. Early decommissioning costs, plant worker health impact costs, electric utility business costs, nuclear power industry costs, and litigation costs are also addressed. The newly developed offsite economic consequence models estimate The costs of post-accident population protective measures and public health impacts. The costs of population evacuation and temporary relocation, agricultural product disposal, land and property decontamination, and land interdiction are included in the economic models for population protective measures. Costs of health impacts and medical care costs are also included in the models.

30940 **(NUREG/CR—3684) Nuclear Power Plant Alarm Prioritization (NPPAP). Program status report, January 1, 1983-September 31, 1983.** Roscoe, B.J. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1984. Contract AC04-76DP00789. 72p. (SAND—84-0140). NTIS, PC A04/MF A01 - GPO; GPO Dep. Order Number DE84011479.

This report describes the status of a research project directed toward nuclear power plant alarm prioritization. Criteria for modified alarm activation are being developed and studied. Also being developed are measures to regulate the alarm rate at some desired level. The problem of alarm prioritization based upon maintenance of critical safety functions while maintaining complete alarm coverage of accidents is being addressed. The plant information needed to support the associated technical development areas is being compiled for a specific plant, categorized, and entered into a computer data base. Near term recommendations for regulatiory action on plant annunciator systems are presented.

30941 **(NUREG/CR—3722) Damping test results for straight sections of 3-inch and 8-inch unpressurized pipes.** Ware, A.G.; Thinnes, G.L. (EG and G Idaho, Inc., Idaho Falls (USA)). Apr 1984. Contract AC07-76ID01570. 60p. (EGG—2305). NTIS, PC A04/MF A01; 1 - GPO; GPO Dep. Order Number DE84011183.

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EG and G Idaho is assisting the Nuclear Regulatory Commission and the Pressure Vessel Research Committee in supporting a final position on revised damping values for structural analyses of nuclear piping systems. As part of this program, a series of vibrational tests on unpressurized 3-in. and 8-in. Schedule 40 carbon steel piping was conducted to determine the changes in structural damping due to various parametric effects. The 33-ft straight sections of piping were supported at the ends. Additionally, intermediate supports comprising spring, rod, and constant-force hangers, as well as a sway brace and snubbers, were used. Excitation was provided by low-force-level hammer impacts, a hydraulic shaker, and a 50-ton overhead crane for snapback testing. Data was recorded using acceleration, strain, and displacement time histories. This report presents test results showing the effect of stress level and type of supports on structural damping in piping.

30942 **(NUREG/CR—3749) COBRA-NC post-test predictions for HDR containment steam blowdown Test V44 (International Standard Problem 16).** Thurgood, M.J. (Pacific Northwest Lab., Richland, WA (USA)). May 1984. Contract AC06-76RL01830. 123p. (PNL—5066). NTIS (US Sales Only), PC A06/MF A01; 1 - GPO $5.00; GPO Dep. Order Number DE84012162.

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COBRA-NC is a digital computer program written in FORTRAN IV that simulates the response of multicompartment light water reactor containment systems to postulated loss-of-coolant accidents. It has been used to perform post-test predictions of the response of the German project HDR containment system to a simulated steam line break blowdown transient. Predictions were made of compartment pressures, gas temperatures, structural temperatures, and differential pressures between rooms. In this report, these predictions are compared with the experimentally measured values. The agreement with the data is reasonable. Improvements in the prediction can be made by more carefully modeling the flow openings between rooms or by using a finer mesh.

30943 **(NUREG/CR—3785) Alternative approaches to providing engineering expertise on shift.** Olson, J.; Schreiber, R.E.; Melber, B.D. (Pacific Northwest Lab., Richland, WA (USA)). May 1984. Contract AC06-76RL01830. 50p. (PNL—5087). NTIS, PC A03/MF A01; 1 - GPO $4.50; GPO Dep. Order Number DE84012815.

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This report represents the conclusions of a project studying the role of engineering expertise on shift in nuclear power plants. Using the present shift technical advisor (STA) position as the base case, several alternatives are analyzed. On-shift alternatives included the STA, the SS (shift supervisor), and the SE (shift engineer). The SE is degreed, experienced, trained, and licensed as a Senior Reactor Operator. Some non-shift alternatives were also studied. These included a cadre of on-call engineers and specialists within continual contact and easy reach of the plant; a technical system of phone and data lines linking the plant with a facility similar to an on-site technical support center; and finally, an SPDS (safety parameter display system) to agument technical upgrading of operator aids presently available. Potential problems considered in the analysis of implementation of these alternatives included job content constraints, problems of crew acceptance, and problems of labor supply and retention. Of the considered alternatives, the SE and SS options appear superior to the current STA approach. The SE approach appears the easiest to implement and the most effective under varied plant conditions. The SE may also serve as liaison to off-site support facilities.

30944 **(ORAU/IEA—84-2(M)) Review of light water reactor safety through the Three Mile Island accident.** Phung, D.L. (Oak Ridge Associated Universities, Inc., TN (USA)). May 1984. Contract AC05-76OR00033. 130p. NTIS, PC A07/MF A01; GPO Dep. Order Number DE84012891.

This review of light water reactor safety through the Three Mile Island accident has the purpose of establishing the baseline over which safety achievement post-TMI is assessed, and the need for new reactor designs and business direction is judged. Five major areas of reactor safety pre-TMI are examined: (1) safety philosophy and institutions, (2) reactor design criteria, (3) operational problems, (4) the Rasmussen reactor safety study, and (5) the TMI accident and repercussions. Although nuclear power has made spectacular achievements over the period pre-TMI and although TMI is technically a minor accident, this review concludes that there were basic flaws in the technology and in the manner safety philosophy was conceived and carried out. These flaws included (1) a reactor design that has high core power density, low heat capacity, and low system tolerance to upsets, (2) reactor deployment that had been expedited without extensive operational experience, (3) rules and regulations that had to play catch-up with commercial reactor development, (4) an industry that was fragmented, shortsighted, and tended to rely on the Nuclear Regulatory Commission for safety guidance, (5) information that was not effectively shared, and (6) attention that was inadequate to the human aspects of reactor operation and to public reaction to the specter of a reactor accident, major or minor.

30945 **(ORAU/IEA—84-5(M)) Investigation of the nuclear source term.** Spiewak, I. (Oak Ridge Associated Universities, Inc., TN (USA)). May 1984. Contract AC05-76OR00033. 25p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012271.

A review is presented of the experimental and analytical basis of predicting the radiological emission anticipated after a core damage accident. Recent predictions of source term are well below those of the Reactor Safety Study (WASH-1400) because they consider fission product retention in the primary system and greater removal of aerosols in the containment. However, although the likelihood of a very large release is substantially reduced, such a release cannot be ruled out.

30946 **(SAND—83-2677C) Sensitivity study of aerosol agglomeration and deposition using the MAEROS model.** Leigh, C.D.; Helton, J.C. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 7p. (CONF-840701—4). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84006290.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

The US Nuclear Regulatory Commission's MELCOR program is developing a new system of codes, the MELCOR code system, to replace current NRC risk assessment codes for reactor accidents. The new code system will model all phenomena essential to the description of severe LWR accidents, will provide credible consequence predictions for severe accidents and meaningful estimates of the uncertainties associated with those predictions, and will have modular structures that facilitate the incorporation of new or alternative phenomenological models. In support of the MELCOR program, a study of the sensitivities and uncertainties associated with MAEROS aerosol code predictions was performed. The study evaluated statistical techniques available for the analysis of the uncertainties and sensitivities associated with the predictions of a moderately complicated computer code and provided guidance for the MELCOR program with respect to the relative importance of fission product behavior processes. The phenomenological insights gained from this study is the focus of this paper.

30947 **(SAND—84-0171C) Phenomenological uncertainties in the suspended radionuclide concentrations in containment during severe LWR accidents.** Williams, D.C.; Murata, K.K.; Tills, J.L. (Sandia National Labs., Albuquerque, NM (USA); Tills (Jack) and Associates, Inc., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 16p. (CONF-840701—11). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012766.

From Topical meeting on fission product behavior and source term research; Snowbird, UT, USA (15 Jul 1984).

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CONTAIN, a code for integrated analysis of containment phenomenologies in complex LWR severe accident sequences, is being applied in a program for evaluating the uncertainties in USNRC-sponsored efforts to better define LWR accident source terms. The Surry TMLB′ sequence was studied in detail. Aerosol agglomeration uncertainties were found to contribute about an order of magnitude to the overall uncertainty in suspended radionuclides (almost entirely). Containment compartmentalization effects contribute substantial uncertainties in either direction, while effects due to complex multicomponent aerosol compositions contribute lesser, but still potentially significant uncertainties (mostly downward). Incomplete treatment of radionuclide decay chains can contribute factor-of-two upward uncertainties.

30948 **(SAND—84-0805C) Plans for a 1/6th scale reinforced concrete containment model.** Jung, J. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 9p. (CONF-8406124—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012280.

From 2. workshop on containment integrity; Washington, DC, USA (13 Jun 1984).

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As part of the US Nuclear Regulatory's (NRC's) Containment Safety Margins Program at Sandia National Laboratories, a 1/6 scale model of a reinforced concrete containment structure will

be built and tested to further study the structural and leakage behavior of nuclear containment buildings during severe accidents. The concrete model will be 35 feet high and 24 feet dia. The cylindrical wall will be 9 inches thick. The conceptual design calls for No. 3 reinforcing bars for its main reinforcing and a 1/16 inch thick steel liner. Other features of the model include operating equipment hatches, personnel lock representations, constrained and unconstrained piping penetrations, and thickened liner sections around penetrations. An important part of the project will be the support tests. These tests are designed to confirm that a high quality model can be built and also to provide a data base of the properties of the various materials used in the model. The current plans call for the model to be ready for testing around the middle of CY86.

30949 **(SAND—84-0904C) Integrity of containment penetrations under severe accident conditions.** Subramanian, C.V. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 13p. (CONF-8406124—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012651.

From 2. workshop on containment integrity; Washington, DC, USA (13 Jun 1984).

The knowledge of the leakage behavior of containments beyond design conditions is required for the evaluation of severe accident mitigation strategies, risk studies, emergency preparedness planning, and siting. Since each containment building has a large number of penetrations, these represent a large number of potential leak paths from the containments. Four NRC programs - the Containment Safety Margins program, the Integrity of Containment Penetrations under Severe Accident Conditions program, the Electrical Penetration Assemblies program and the Isolation Valves program are currently in place to evaluate containment integrity and the potential for leakage beyond design conditions. This paper will summarize the details of two of these programs the Integrity of Containment Penetrations Under Severe Accident Conditions and the Electrical Penetration Assemblies. The test plan, the input loads, the number and types of penetration to be tested under these two programs will be discussed.

30950 **(SAND—84-1039C) Post-CHF model assessment with Lehigh nonequilibrium data.** Webb, S.W.; Chen, J.C. (Sandia National Labs., Albuquerque, NM (USA); Lehigh Univ., Bethlehem, PA (USA). Dept. of Chemical Engineering). 03 Jun 1984. Contract AC04-76DP00789. 8p. (CONF-840614—57). NTIS, PC A02; 3; GPO Dep. Order Number DE84012764.

From Annual meeting of the American Nuclear Society; New Orleans, LA, USA (3 Jun 1984).

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Existing equilibrium and nonequilibrium convective film boiling correlations have been compared with recent nonequilibrium data obtained at Lehigh University. Data-model comparisons for the wall heat flux and vapor superheat are presented. None of the equilibrium correlations satisfactorily predict the data. The nonequilibrium models, while usually able to satisfactorily predict the heat flux, do not adequately predict the vapor superheat data.

30951 **(SAND—84-1040C) Two-region vapor generation rate model for convective film boiling.** Webb, S.W.; Chen, J.C. (Sandia National Labs., Albuquerque, NM (USA); Lehigh Univ., Bethlehem, PA (USA). Inst. of Thermo-Fluid Engineering and Science). 1984. Contract AC04-76DP00789. 24p. (CONF-8404146—3). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012765.

From International workshop on fundamental aspects of post-dryout heat transfer; Salt Lake City, UT, USA (2 Apr 1984).

A convective film boiling heat transfer model has been developed based on the recently obtained Lehigh University and INEL nonequilibrium data. A two-region vapor generation rate model is proposed including a near-field region and a far-field region. The heat transfer in convective film boiling has also been correlated in terms of enhancement of single-phase values due to the entrained liquid. Comparison of this new model with the data shows significant improvement in the prediction of thermodynamic nonequilibrium and wall heat flux over existing models. 15 references.

30952 **(SAND—84-1095C) Analysis of a 1:8 scale steel containment model subject to internal static pressurization.** Clauss, D.B. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 25p. (CONF-8406124—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012655.

From 2. workshop on containment integrity; Washington, DC, USA (13 Jun 1984).

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The Containment Integrity Division at Sandia National Laboratories is investigating the response of nuclear containments subjected to loads that could arise during severe accidents. As part of this program, a 1:8 scale steel containment model has been built and will be tested to determine the response due to overpressurization. This experimental model contains several prototypical penetrations including personnel lock representations, operable equipment hatches, a constrained pipe penetration, and other pipe penetrations. Pretest predictions of the response of the experimental model to static overpressurization have been obtained using finite element methods. Analyses of a ring stiffened shell with (1) no penetrations, (2) a personnel lock, (3) an equipment hatch, and (4) a constrained pipe penetration are discussed. Each of the models represents a different circumferential segment of the experimental model. The response of the ring stiffened shell with no penetrations is compared to the response of the ring stiffened shell with penetrations, and conclusions are made regarding the effect of penetrations on containment behavior. Leakage around the 0 ring seal in the equipment hatch assembly is discussed.

30953 **(SAND—84-1166C) Response of steel containment models to internal pressurization.** Horschel, D.S.; Clauss, D.B. (Sandia National Labs., Albuquerque, NM (USA)). 30 May 1984. Contract AC04-76DP00789. 20p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012549.

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To obtain insight and data on the response of containment vessels subjected to beyond design basis accidents, four 1/32-scale steel containment models have been subjected to internal overpressurization, and a 1/8 scale containment model is to be tested shortly. The containment models are being analyzed prior to testing. Both analysis and experimental data are discussed and compared for the 1/32 scale containment models. Details and results of the analyses performed on the 1/8 scale steel model are presented.

30954 **(TPR-NS—25-No.2) Nuclear Safety, Volume 25, No. 2. Technical progress review, March-April 1984.** Cottrell, W.B. (ed.). (Oak Ridge National Lab., TN (USA)). Mar 1984. 147p. GPO $6.50. Order Number TI84006789.

A separate abstract was prepared for each of 7 papers. (HDR)

30955 **(UCRL—86247) Impact analyses after pipe rupture.** Chun, R.C.; Chuang, T.Y. (Lawrence Livermore National Lab., CA (USA)). 13 Dec 1983. Contract W-7405-ENG-48. 16p. (CONF-840718—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84005135.

From International conference on structural impact and crashworthiness; London, UK (16 Jul 1984).

Two of the French pipe whip experiments are reproduced with the computer code WIPS. The WIPS results are in good agreement with the experimental data and the French computer code TEDEL. This justifies the use of its pipe element in conjunction with its U-bar element in a simplified method of impact analyses.

30956 **(UCRL—90029) Uncertainty in soil-structure interaction analysis of a nuclear power plant due to different analytical techniques.** Chen, J.C.; Chun, R.C.; Goudreau, G.L.; Maslenikov, O.R.; Johnson, J.J. (Lawrence Livermore National Lab., CA (USA); Structural Mechanics Associates, San Ramon, CA (USA)). 1984. Contract W-7405-ENG-48. 14p. (CONF-840703—1). NTIS, PC A02/MF A01. Order Number DE84003727.

From 8. world conference on earthquake engineering; San Francisco, CA, USA (21 Jul 1984).

This paper summarizes the results of the dynamic response analysis of the Zion reactor containment building using three different soil-structure interaction (SSI) analytical procedures which are: the substructure method, CLASSI; the equivalent linear finite element approach, ALUSH; and the nonlinear finite element procedure, DYNA3D. Uncertainties in analyzing a soil-structure system due to SSI analysis procedures were investigated. Responses at selected locations in the structure were compared through peak accelerations and response spectra.

30957 **Planning for spontaneous evacuation during a radiological emergency.** Johnson, J.H. Jr. (Univ. of California, Los Angeles). *Nuclear Safety;* **25**: No. 2, 186-194(Mar 1984).

The Federal Emergency Management Agency's (FEMA's) radiological emergency preparedness program ignores the potential problem of spontaneous evacuation during a nuclear reactor accident. To show the importance of incorporating the emergency spatial behaviors of the population at risk in radiological emergency preparedness and response plans, this article presents empirical evidence that demonstrates the potential magnitude and geographic extent of spontaneous evacuation in the event of an accident at the Long Island Lighting Company's Shoreham Nuclear Power Station. The results indicate that, on the average, 39% of the population of Long Island is likely to evacuate spontaneously and thus to cast an evacuation shadow extending at least 25 miles beyond the plant. On the basis of these findings, necessary revisions to FEMA's radiological emergency preparedness program are outlined.

30958 **Simulations of loss-of-flow accidents in an LMFBR with the Sodium Loop Safety Facility.** Kraft, T.E.; Ragland, W.A.; Thompson, D.H. (Argonne National Lab., IL). *Nuclear Safety;* **25**: No. 2, 200-211(Mar 1984).

The Sodium Loop Safety Facility (SLSF), a major facility in the US fast-reactor safety program, has been used to simulate an unprotected loss-of-flow accident in a sodium-cooled breeder reactor. A series of three SLSF experiments, conducted under prototypic thermal-hydraulic conditions, gives a sequential view of the fuel-bundle disruption during such an accident: the 19-pin experiment P2 ran to the point of extensive fuel motion; the 37-pin experiments P3A and P3 ran to initial fuel-pellet disruption and initial fuel motion, respectively. The experiments are summarized, and the conclusions drawn from the series are discussed.

30959 **Application of sodium-concrete reaction data on breeder-reactor safety analysis.** Muhlestein, L.D.; Postma, A.K. (Westinghouse Hanford Co., Richland, WA). *Nuclear Safety;* **25**: No. 2, 212-220(Mar 1984).

Sodium-concrete reactions are of importance to breeder-reactor safety analysis because they may provide energy and gases (notably hydrogen) that may contribute to the challenge of containment integrity following a postulated severe accident. Sodium-concrete reactions are reviewed with focus on the hydrogen generation rate, energy release rate, and extent to which concrete may be degraded as a result of these reactions. Sodium-concrete reaction models are also noted along with a conceptual model. Conclusions are drawn from the many test programs performed.

30960 **Guidelines for an effective SPDS implementation program.** Blanch, P.M.; Wilkinson, C.D. (Northeast Utilities Service Co., Hartford, CT). *Nuclear Safety;* **25**: No. 2, 221-226(Mar 1984).

Guidelines developed by the Nuclear Utility Task Action Committee for the implementation of a safety parameter display system (SPDS) are summarized. These guidelines reflect the consensus of nuclear utilities on how SPDS requirements, as set up by the Nuclear Regulatory Commission, could be met. This article includes a functional definition of SPDS and discussions of SPDS implementation plans, design bases, purchase specifications, training, integration and documentation, and verification and validation.

30961 **Accelerated-aging tests for predicting radiation degradation of organic materials.** Clough, R.L.; Gillen, K.T.; Campan, J.L.; Gaussens, G.; Schoenbacher, H.; Seguchi, T.; Wilski, H.; Machi, S. (Sandia National Labs., Albuquerque, NM; CEA Centre d'Etudes Nucleaires de Cadarache, France; CEA Centre d'Etudes Nucleaires de Saclay, France; European Organization for Nuclear Research (CERN), Geneva, Switzerland; Japan Atomic Energy Research Inst. (JAERI), Takasaki). *Nuclear Safety;* **25**: No. 2, 238-254(Mar 1984).

Long-term aging of organic materials in reactor containment buildings has become a major issue within the nuclear community. In this article, the status of radiation-aging qualification test requirements in several countries is reviewed, and problems with the current aging methodologies are described. These problems include dose-rate and synergistic effects and environmental synergisms, which have been found for many different polymeric materials. A number of approaches to improved accelerated-radiation-aging tests for prediction of long-term aging behavior are discussed together with their limitations.

30962 **Potentially damaging failure modes of high- and medium-voltage electrical equipment.** Hoy, H.C. (Oak Ridge National Lab., TN). *Nuclear Safety;* **25**: No. 2, 255-262(Mar 1984).

The high- and medium-voltage electrical equipment failures of both nuclear and nonnuclear electric utilities have been reviewed for possible disruptive failure modes that would be of special concern in a nuclear power plant. The resulting emphasis was on the electrical faults of transformers, switchgear (circuit breakers), lightning (surge) arrestors, high-voltage cabling and buswork, control boards, and other electrical equipment that, through failure, can be the initiating event that may expand the original fault to nearby or associated equipment. Many failures of such equipment were found and documented, although the failure rate of electrical equipment in utilities is historically quite low. Nuclear plants record too few failures to be statistically valid, but failures that have been recorded show that good design usually restricts the failure to a single piece of equipment. Conclusions and recommendations pertaining to the design, maintenance, and operation of the affected electrical equipment are presented.

30963 **An analytical study of azimuthal temperature distribution in pressurized water reactor fuel rods under steady-state and blowdown conditions.** Sdouz, G.; Dagbjartsson, S.J. (Austrian Research Center Seibersdorf A-1082 Vienna). *Nuclear Technology;* **57**: No. 3, 331-342(Jun 1982).

An analytical study was conducted to quantify the azimuthal temperature variations that might occur around a light water reactor nuclear fuel rod under steady-state and loss-of-coolant accident (LOCA) blowdown conditions. Significant azimuthal temperature variations on the cladding surface will result in a reduction of the total circumferential elongation of the cladding deforming in the alpha phase of the Zircaloy and thus a reduction in coolant channel blockage. Power skewing across the fuel rod and off-center location of the fuel pellet within the cladding are considered as possible causes for an asymmetrical temperature distribution on the cladding. The conclusions reached were as follows. Off-center location of a fuel pellet produces significant azimuthal temperature variations in the fuel during steady-state operation and small circumferential temperature differences in the cladding during the LOCA blowdown. Highly localized small strains-to-failure in Zircaloy out-of-pile ballooning experiments may not be representative of in-pile results where cladding temperatures are calculated to be relatively uniform.

30964 **Scaling laws of transient heat and mass flow for modeling the loss of coolant accident.** Benedek, S. (Institute for Electrical Power Research H-1368 Budapest, POB, 233). *Nuclear Technology;* **57**: No. 2, 255-263(May 1982).

The general scaling laws for transient one- and two-phase mass and heat flow, and the other conditions that hold in the transitional state, have been published. Details of the scaling of loss of coolant accident phenomena for water-cooled nuclear reactors are investigated by means of experimental loops using water and

Freon-12. To a smaller extent the authors have also investigated the scaling of heat- and mass-flow transients in sodium-cooled nuclear reactors by using water.

30965 **Evaluation of the SLSF P2 loss-of-flow safety experiment.** Holland, J.W.; Bordner, G.L.; Kelman, L.R. (Argonne National Laboratory, 9700 S. Cass Ave., Argonne, Illinois). *Alternative Energy Sources;* **5**: 45-55(Dec 1980). (CONF-801210—).

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

An in-reactor safety experiment was performed in the Sodium Loop Safety Facility with a 19-pin, mixed-oxide fuel bundle that simulated a fast reactor accident. Cladding failure and melting, bundle blockage formation, and fuel melting events occurred slightly later than expected. Postirradiation examination data are consistent with accident scenarios in which molten fuel-steel mixtures disperse from the core midplane due to steel vaporization. Approximately 1 s after reactor scram, a fuel-motion event occurred that caused the upward relocation of the upper steel blockage and shroud failure with the ensuing release of a molten fuel-metal mixture from the original fueled region.

30966 **Sodium flow blockage in liquid-metal fast breeder reactors: sweepout of a planar blockage.** Warinner, D.K.; Saxena, S.C. (Argonne National Laboratory, 9700 S. Cass Ave. Argonne, Illinois 60439). *Nuclear Science and Engineering;* **76**: No. 3, 361-366(Dec 1980).

The method-of-Ergun fluidization theory is applied to a postulated porous blockage in the core of a liquid-metal fast breeder reactor (LMFBR). By the parallel flow channeling through the subassemblies of the reactor, a definite pressure gradient is imposed across each subassembly. This pressure gradient is found to be sufficient to fluidize (and entrain particles from) any postulated loose-particle-formed blockage. A parametric study that considers a range of reactor materials and sodium coolant temperatures demonstrates that a radially large planar blockage cannot be reasonably postulated to exist in an LMFBR. Further, any radially large particulate blockage would be subjected to fluidization and ultimate destruction by entrainment and turbulent flow forces. Thus, flow starvation via a slowly growing blockage can be dismissed as an incredible event.

30967 **The effects of sodium entrainment and heat transfer with two-phase UO_2 during a hypothetical core disruptive accident.** Corradini, M.L.; Rohsenow, W.M.; Todreas, N.E. (Massachusetts Institute of Technology Department of Mechanical and Nuclear Engineering Cambridge, Massachusetts 02139). *Nuclear Science and Engineering;* **73**: No. 3, 242-258(Mar 1980).

A major portion of the safety analysis effort for the liquid-metal fast breeder reactor is involved in assessing the consequences of a hypothetical core disruptive accident. A postulated loss-of-flow transient without scram may produce a two-phase fuel source at high pressures. The heat transfer process between the fuel and the sodium coolant as it is ejected into the upper plenum is described in this study. One mechanism that can cause the coolant to become entrained in the two-phase fuel is Taylor instabilities. The characteristic size of the entrained coolant droplets is considered to be equal to the critical wavelength of a Taylor instability. Analysis of full-scale reactor conditions indicates that the dominant heat transfer mechanism is radiation. Also, if noncondensible gases are absent, fuel vapor condensation on the sodium coolant droplets is controlled by mass diffusion, hence the subsequent rate of coolant vaporization is small. The net effect of the heat transfer is to reduce the fuel vapor pressure and reduce the expansion work by a factor of 1.2 to 2.5 Small-scale simulant experiments utilizing refrigerants could confirm the fuel condensation/sodium vaporization behavior, while reactor material tests must be done to investigate the radiation heat transfer mechanism.

30968 **Parameter estimation of liquid-metal fast breeder reactor simulation experiments using univariate autoregressive integrated moving average modeling.** Pekarsky, M.I.; Doerner, R.C.; Meek, C.C. (Argonne National Laboratory, 9700 South Cass Avenue Argonne, Illinois 60439). *Nuclear Science and Engineering;* **73**: No. 3, 286-289(Mar 1980).

A methodology for combining physical considerations with those of autoregressive integrated moving average time series analysis is presented. It is shown that the former can provide identification of the resultant model, while the latter can furnish a means for parameter estimation. Application of the techniques so derived to an analysis of a simulated liquid-metal fast breeder reactor accident experiment demonstrates the method and its usefulness in analyzing transient situations.

30969 **Heat transfer and pressure drop in sodium boiling in tubes.** Zeigarnick, Y.A.; Litvinov, V.D. (Institute of High Temperatures of Academy of Sciences of the USSR Korovinskoe Shosse, Moscow 127412). *Nuclear Science and Engineering;* **73**: No. 1, 19-28(Jan 1980).

Data on the heat transfer and the pressure drop in sodium under forced convection boiling are presented. It is shown that in annular-dispersed flow, a difference between wall and saturation temperatures is small, being within 1 to 5°C. It is also shown that in two-phase alkali-metal flow with heat input friction losses are smaller than in adiabatic flow. This is associated with a "push aside" effect on the main stream of the vapor flowing from the interface. The heat transfer and friction loss data indicate that the phase change takes place by evaporation from a liquid film surface, without vapor bubble generation at the wall. The experiments showed that, even in the presence of artificial cavities, the incipient superheat is statistical in nature. The efficiency of the double-reentrant-angle-type cavities and of inert gas injection as a means of stabilizing forced convection boiling of the alkali metal was proven.

25 ENERGY STORAGE

2501 Magnetic

REFER ALSO TO CITATION(S) 30649

30970 **(LA-UR—84-1291) 30 MJ superconducting magnetic energy storage performance on the Bonneville Power Administration utility transmission system.** Rogers, J.D.; Boenig, H.J. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 7p. (CONF-840804—8). NTIS, PC A02; 3; GPO Dep. Order Number DE84011340.

From Intersociety energy conversion engineering conference; San Francisco, CA, USA (19 Aug 1984).

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The 30 MJ, 10 MW superconducting magnetic energy storage (SMES) system was devised to interact in the Western U.S. Power System as an alternate means to damp unstable oscillations at 0.35 Hz on the Pacific HVAC Intertie. The SMES unit was installed at the Tacoma Substation of the Bonneville Power Administration (BPA). The operating limits of the 30 MJ SMES unit were established, and different means of controlling real and reactive power were tested. Experiments showed that the Pacific AC Intertie has current and reactive power variations of the same frequency as the modulating frequency of the SMES device. Endurance tests were run to assess the reliability of the SMES subsystems with a narrow band noise input, which is characteristic of the modulation signal for stabilizer operation. During the endurance tests, parameters of the ac power system were determined.

2504 Capacitor Banks

30971 **(EPRI-EL—3452) Compact capacitor/filter development. Final report.** Dodds, J.; Oswalt, N.; Johansson, A.; Danemar, A. (Brown Boveri Electric, Inc., Greensburg, PA (USA)). Apr 1984. 387p. Electric Power Research Institute-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920357.

This report presents the results of a program to develop compact capacitor banks and harmonic filters for transmission voltages with an installed cost equivalent to air insulated capacitor banks. The objective of this work was to develop, design, build, install, and field test such compact capacitor banks. For demonstra-

tion purposes, a single phase 362-kV shunt bank and a three phase 145-kV 11th harmonic filter were to be designed, constructed, and field tested.

30972 **(LA-UR—79-1044-App.) Energy storage capacitors.** Sarjeant, W.J. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 54p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84010040.

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The properties of capacitors are reviewed in general, including dielectrics, induced polarization, and permanent polarization. Then capacitance characteristics are discussed and modelled. These include temperature range, voltage, equivalent series resistance, capacitive reactance, impedance, dissipation factor, humidity and frequency effects, storage temperature and time, and lifetime. Applications of energy storage capacitors are then discussed. (LEW)

2506 Thermal

30973 **(FRNC-TH—1533) Design and experiment of high-temperature tubular heat accumulator using the latent fusion heat of "Zamak 3" alloy.** Marsault, L. (Poitiers Univ., 86 (France)). Jul 1982. 194p. (In French). NTIS (US Sales Only), PC A09. Order Number DE84751543.

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The general design of the prototype heat accumulator using the aluminium and zinc alloy Zamak 3 encapsulated, operating between 300°C and 500°C is presented. The energy is stored in the form of latent heat of fusion in one tonne of Zamak contained in a vertical tube array. The heat carrier fluid is air. A numerical approximation of its operation by means of a simplified simulation model is studied. The presentation and the analysis of actual performance figures, for the prototype under different operating conditions are given. Modifications to improve the performance are proposed.

2508 Chemical

REFER ALSO TO CITATION(S) 31415

30974 **(DOE/R7/01250—T1) Storing solar energy with liquid phase Diels-Alder reactions. Final report.** Poling, B.E. (Missouri Univ., Rolla (USA). Dept. of Chemical Engineering). 28 Jul 1983. Contract FG47-81R701250. 20p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84010438.

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At the beginning of this project, a preliminary study was completed that indicated the Diels-Alder reaction between maleic anhydride and 2 methyl furan had an energy storage capacity greater than water. During the last two years when this grant was in effect, three additional projects have been completed. First, an improved calorimetric techniques was developed for determination of the energy storage capacity of a reversible liquid phase chemical reaction. This technique confirmed the validity of the earlier results for the maleic anhydride-methyl furan reaction. Second, a technique was developed for characterizing solution nonidealities for mixtures in which reversible chemical reactions occur. It was found that for the maleic anhydride-2 methyl furan reaction, these non idealities could affect equilibrium compositions by nearly 40%. Third, drop calorimetry was used as a screening method to examine sixteen reactions for their potential as energy storage candidates. Of the sixteen examined, three (all involving maleic anhydride and substituted furan) showed an increased energy storage capacity due to reaction while the remaining thirteen showed no increase. In the following report, results of these three studies are summarized. Finally, a general summary of the status of energy storage by chemical reactions is presented.

30975 **(DOE/R7/01250—T2) Energy storage capacity of reversible liquid phase Diels-Alder reactions as determined by drop calorimetry.** Chung, C.P. (Missouri Univ., Rolla (USA)). 1983. Contract FG47-81R701250. 50p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84010439.

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Several Diels-Alder reactions were evaluated as possible candidates for energy storage. The goal was to use simple drop calorimetry to screen reactions and to identify those with high energy storage capacities. The dienes used were furan and substituted furans. The dienophiles used were maleic anhydride and substituted maleic anhydrides. Sixteen reactions have been examined. Three had energy storage capacities that were increased due to reaction (maleic anhydride and 2-methyl furan, maleic anhydride and 2-ethyl furan, maleic anhydride and 2,5-dimethyl furan). The remaining thirteen showed no increase in apparent heat capacity due to reaction.

30976 **(DOE/R7/01250—T3) Calorimetric determination of the thermodynamic behavior of reversible liquid-phase reactions for use in energy storage.** Thompson, P.F. (Missouri Univ., Rolla (USA)). 1983. Contract FG47-81R701250. 99p. NTIS, PC A05/MF A01; 1; 1; GPO Dep. Order Number DE84010437.

Portions are illegible in microfiche products; Thesis.

A new calorimetric method of determining equilibrium mole fractions of labile species that participate in reversible, liquid-phase reactions has been developed. This technique relies on the fact that a reactant-solvent mixture of just the right composition will shift the equilibrium neither to the left nor to the right and thus will neither absorb nor generate heat when injected into an equilibrium mixture. Using the open-system energy balance, initial mole fraction valves for each constituent, and the experimentally determined composition of the reactant-solvent mixture which causes no reaction, the equilibrium mole fraction of each constituent can be determined.

2509 Batteries

30977 **(AD-A—137085/7) Charge storage in doped poly(thiophene). Technical report.** Chung, T.C.; Kaufman, J.H.; Heeger, A.J.; Wudl, F. (California Univ., Santa Barbara (USA). Inst. for Polymers and Organic Solids). 6 Jan 1984. 26p. NTIS, PC A03/MF A01.

This paper presents a new method of electrochemical polymerization of poly(thiophene) using dithiophene as the starting material, from which a high quality film with a sharp interband absorption edge is obtained. An in situ study of the absorption spectrum during the electrochemical doping process has been carried out. In the dilute regime, the results are in detailed agreement with charge storage via bipolarons; weakly confined soliton pairs with confinement parameter gamma = 0.1-0.2. At the highest doping levels, the data are characteristic of the free carrier absorption expected for a metal. From a parallel electrochemical voltage spectroscopy (EVS) study, we find evidence of charge injection near the band edge and charge removal from the bipolaron gap states. In the dilute regime, the position of the chemical potential is consistent with charge storage in weakly confined bipolarons. the high Coulombic recovery over a charge-discharge cycle indicates that poly(thiphene) may be an excellent cathode-active material in battery applications.

30978 **(EPRI-EM—2995) Battery Energy Storage Test (BEST) Facility. Third progress report, review and summary through June 1983.** Hyman, E.A. (Public Service Electric and Gas Co., Newark, NJ (USA)). Apr 1984. Contract AC02-76ET29368. 105p. NTIS, PC A06/MF A01; 1 - EPRI; GPO Dep. Order Number DE84012127.

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The Battery Energy Storage Test (BEST) Facility is a national center for testing and evaluating battery energy storage systems, including associated electrical conversion equipment developed for use on electric power grids. This interim report covers the period January 1980-June 1983 in which the following results were achieved: completed baseline facility construction including ac link to 13.8-kV PSE and G substation; installed all operating equipment; completed operational acceptance test; prepared procedures and protocols for all phases of operation, maintenance, data management, personnel training, and public relations; operated 1.8-MWh station battery, 2.5-MW ac/dc converter, and computer control system for one year in a series of cycling modes representing vari-

ous utility applications; prepared Bay-2 for installation in September 1983 of a 500-kWh zinc chloride battery including a 300-kW ac/dc converter and control system; planned for installation in October 1983 in Bay 1 a 500-kW, 500-kWh lead-acid battery with converter and control system; and demonstrated that the facility does meet project objectives as a focal point for a national program to commercialize battery energy storage systems.

30979 **(LBL—17741) Technology base research project for electrochemical energy storage. Executive summary report for 1983.** Kinoshita, K. (ed.). (Lawrence Berkeley Lab., CA (USA)). 11 May 1984. Contract AC03-76SF00098. 19p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012248.

The Lawrence Berkeley Laboratory (LBL) is the Lead Center for management of the Technology Base Research (TBR) Project, which is supported by DOE's Office of Energy Systems Research, Energy Storage Division. The purpose of this project is to provide the research base which supports DOE efforts to develop electrochemical technology for electric vehicle and stationary energy storage applications. The general objective of the TBR project is to help provide advanced electrochemical systems that can satisfy stringent performance and economic requirements for electric vehicle and stationary energy storage applications. The TBR project is divided into four major project elements: Electrochemical Systems Research, Supporting Research, Electrochemical Processes, and Fuel Cells for Vehicles. This report summarizes the research, financial, and management activities relevant to the TBR project in CY 1983. Highlights of each project element are summarized according to the appropriate battery system or electrochemical research area.

30980 **(NYSERDA—84-9) Electrode-induced beta battery degradation. Final report.** Browall, K.W. (General Electric Co., Schenectady, NY (USA). Advanced Energy Programs Dept.). Nov 1983. 35p. New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223. Order Number TI84901062.

The purpose of this study was to investigate sodium and sulfur electrode effects on beta″-alumina ceramic electrolyte degradation. Specifically, four aspects were examined: (1) the sulfur electrode resistance contribution to overall cell resistance and resistance changes with time; (2) effects of calcium and potassium impurities in the sodium electrode on performance and cell life; (3) effect of air contamination on cell performance; and (4) evaluation of the sulfur electrode's chemical corrosivity on the ceramic. Key results include the following: for cells with Generation 8 beta″-alumina ceramic, cell resistance rise is not monotonic. However, up to at least ~ 1000 Ah/cm², the sulfur electrode appears to perform satisfactorily. The results show that high levels of potassium and calcium in sodium are harmful, but that calcium levels up to 50 ppM and potassium levels up to ~ 270 ppM did not appear to have an adverse short-term effect on cell performance or life. Longer term study is warranted, however, in view of the severity of effects at levels above this. For example, calcium levels in excess of several hundred ppM led to severe pitting of the beta″-ceramic. Addition of dry oxygen to the sodium compartment led to sodium oxide formation and a reduction in cell capacity, while wet oxygen introduction caused rapid deterioration in cell performance and life. Dry nitrogen addition to the sodium compartment had no effect on either performance or resistance while wet nitrogen had an effect similar to wet oxygen. Finally, it was found that preferential cycling in either the one- or two-phase region had no influence on beta″-alumina surface degradation.

30981 **(SAND—84-0716C) Sandia storage battery program status.** Clark, R.P.; Butler, P.C.; Chamberlin, J.L.; Grothaus, K.R. (Sandia National Labs., Albuquerque, NM (USA)). 12 Jun 1984. Contract AC04-76DP00789. 17p. (CONF-8406119—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011482.

From 31. power sources symposium; Cherry Hills, NY, USA (12 Jun 1984).

Sandia National Laboratories has lead center responsibility for the development of storage batteries for the US Department of Energy. This activity has been designated the Exploratory Technology Development and Testing (ETD) Project. This paper presents an overview of the ETD Project with an emphasis on the Sandia supporting activities. In most areas these activities reflect work in process rather than completed work.

30982 **(SAND—84-7105) Analysis of lead-acid battery deep-cycle accelerated testing data.** Clifford, J.E.; Thomas, R.E. (Battelle Columbus Labs., OH (USA)). Jun 1984. Contract AC04-76DP00789. 65p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84013192.

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Battelle conducted a detailed analysis of the deep cycle, accelerated test data (at a nominal 70 C) obtained by Exide in the three-year, Phase I program to develop advanced lead-acid batteries for utility load leveling. Cycle life results for 60 lead-acid cells in three fractional factorial experiments were analyzed to develop quantitative relationships for real-time cycles to failure as a function of cell design variables. Important factors affecting cycle life were depth of discharge with respect to plate active material and acid within the plate stack, acid specific gravity, separator system design, and additives in the active material.

30983 **Surface oxygen chemical potential in a gas-solid reaction.** DeJonghe, L.C.; Chang, M. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory, and Department of Materials Science and Mineral Engineering, University of California, Berkeley, California). *Journal of the Electrochemical Society;* **130**: No. 11, 2263-2266(Nov 1983). Contract AC03-76SF00098.

A method is developed defining the oxygen chemical potential on the surface of oxide on the metal phase during a gaseous reduction reaction. The method couples the gas reaction with a solid-state defect reaction. It is shown that, during this gas-solid reaction, the surface oxygen chemical potential, μ/SUB s/, is between that of the gas phase, μ/SUB g/, and that of the metal/metal oxide equilibrium, μ/SUB e/. If the adsorption-desorption step is slow, μ/SUB/s is close to μ/SUB e/; if the adsorption-desorption step is fast, μ/SUB s/ is close to μ/SUB g/.

30984 **Thermal energy generation of LiAl/FeS cells.** Chen, D.M.; Gibbard, H.F. (Gould Incorporated, Gould Research Center, Rolling Meadows, Illinois). *Journal of the Electrochemical Society;* **130**: No. 10, 1975-1979(Oct 1983).

Two independent methods were employed to determine the rate of thermal energy generation in 200 A-hr lithium-aluminum/iron sulfide cells. The first is an indirect method using thermodynamic calculations based on precise measurements of the cell potential as a function of temperature and state of charge, combined with measurements of the overpotential during discharge. The second is the direct measurement of the cell heat generation using a new high temperature battery calorimeter. The results obtained by these two methods are in excellent agreement. The rate of heat generation is 40-50W per cell during the last 30% of discharge at 100A. Under certain conditions the cell reaction, initially exothermic, becomes endothermic and then exothermic again during discharge. This unusual behavior is caused by the formation of intermediate J-phase ($LiK_6Fe_{24}S_{26}Cl$) and X-phase (Li_2FeS_2) compounds during the course of discharge.

30985 **The effect of additives on current distribution in pasted zinc electrodes.** McBreen, J.; Gannon, E. (Brookhaven National Laboratory, Department of Energy and Environment, Upton, New York). *Journal of the Electrochemical Society;* **130**: No. 10, 1980-1982(Oct 1983).

The effect of additives on current distribution during formation of a pasted zinc electrode was investigated in a twoelectrode zinc-nickel oxide cell with a sectioned nickel oxide electrode. The zinc electrodes consisted of zinc oxide, a PTFE binder, and small weight percentage additions of the oxides of high hydrogen overvoltage metals. The square nickel oxide electrode was divided into sixteen square sections, consisting of four center and twelve edge sections. It was assumed that the current to each section was an exact measure of the current to that section of the zinc electrode that was in register with the section. In the case of zinc electrodes

with no additive, the average current density at the edge sections was about twice that found at the center sections. Additions of Bi_2O_3, Ga_2O_3, CdO, and HgO had little effect on the current distribution. Additions of Tl_2O_3 and $In(OH)_3$ resulted in very even current distribution over the electrode area. Anomalous effects were found with PbO additions because of leaching of the additive into the electrolyte at the electrode edges.

30986 **Corrosion reactions in lithium sulfur dioxide cells.** Levy, S.C. (Sandia National Laboratories, Albuquerque, NM). *Proceedings - Electrochemical Society;* **83-1**: 9-16(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

Long-term testing of Li/SO_2 cells resulted in many premature failures. Studies of failed cells indicated corrosion contributed significantly to the failure mechanisms. In particular, two corrosion reactions were conspicuous, in the glass at the glass-to-metal seal and at the tantalum in the positive lead. A program was initiated to solve these problems. Models for the corrosive attacks were developed. Based on the models, a new glass formulation was prepared and a new positive lead material selected. Initial tests showed the new materials to have a significant improvement in corrosion resistance over the standard materials.

30987 **Lithium oxide in Li(Si)/FeS2 thermal batteries.** Searcy, J.Q.; Armijo, J.R.; Neiswander, P. (Sandia National Laboratories, Albuquerque, New Mexico). *Proceedings - Electrochemical Society;* **83-1**: 43-49(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

The formation of Li_2O in Li(Si)/FeS_2 thermal batteries has been considered deleterious to performance. This paper presents the results of a study to determine performance degradation caused by Li_2O and to determine an acceptable level of Li_2O to define dryness of battery parts and allowable leak rates. The significant results are (1) Excessive Li_2O causes an abrupt end of life during discharge of Li_7Si_3 to $Li_{12}Si_7$. This effect is first observed at 15 wt% and always occurs if the Li_2O content of the anode reaches 30 wt%. (2) A layer of Li_2O on anode pellet surfaces adjacent to the current collectors causes the same abrupt end of life if that layer represents 6-8 wt% Li_2O in the anode pellet. (3) Li_2O increases the "wetness" of separator pellets. This effect reaches a plateau at about2.5 wt% Li_2O in a separator pellet which is 65 wt% LiC1. KC1 eutectic blended with 35 wt% MgO.

30988 **Nuclear power systems for spacecraft.** Lafleur, J.D. Jr. (Atomic Energy Commission, Germantown, MD). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Aerospace and Electronics Systems;* **AES-6**: No. 2, 147-164(Mar 1970).

A review and comparison of the weights, sizes, and costs of nuclear and nonnuclear spacecraft power systems is presented and discussed. Nuclear power systems include the range below 10 kw, with an electrical output to weight ratio of 0.5 to 1.0 pounds per watt. Comparisons show that primary batteries are light for short-duration missions of a few hours; fuel cells are lighter for duration of one to two months, and solar-cell/secondary battery combinations are to be preferred when sunlight is adequate. 10 references.

30989 **Self regenerating storage battery.** Silver, G.L. (to USAEC). US Patent 3,492,160. 27 Jan 1970. Filed date 27 Mar 1968. vp.

PAT-APPL-716,436.

A radioactive voltaic battery which is self recharging comprises an anodic cell having low valence plutonium ions for oxidation dissolved in an acid solution, a cathodic cell having plutonium ions of a higher valence for reduction dissolved in a more concentrated acid solution, and means for providing ion migration between the anodic and cathodic censopen circuit conditions. The anodic cell regenerates the low valence plutonium ions and the cathodic cell regenerates plutonium ions having the higher valence.

29 ENERGY PLANNING AND POLICY

REFER ALSO TO CITATION(S) 32394

30990 **(GAO/AFMD—84-13) Improvements needed in EPA's Inspector General operations.** Bowsher, C.A. (General Accounting Office, Washington, DC (USA). Office of the Comptroller General). 21 Oct 1983. 54p. US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760. Order Number TI84901122.

At the request of the Subcommittee on Natural Resources, Agriculture Research and Environment and the Subcommittee on Civil Service, House of Representatives, GAO reviewed the operations of the Office of Inspector General, Environmental Protection Agency, under the leadership of former Inspector General Matthew Novick. GAO found that although most investigations appear to have been handled properly, in some cases all relevant matters were not followed up and consistently addressed. GAO also noted the need to use investigative resources more effectively and to provide more balanced audit coverage. Acting Inspector General Charles Dempsey recognized and made a concerted effort to correct many problems during his tenure. GAO recommends further actions to strengthen inspector general operations at EPA.

30991 **(NP—4770282) Zaire - energy situation 1982.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Jan 1984. 11p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770282.

After some general remarks on Zaire's energy situation and energy policy, some relevant data are presented on the situation of petroleum. Electric power generation is discussed. The report closes on a few remarks on external data.

2901 Energy Analysis And Modeling

REFER ALSO TO CITATION(S) 30247

30992 **(DOE/EI/06409—T1) REGSHARE model systems and data base guide.** (CONSAD Research Corp., Vienna, VA (USA)). 19 Jun 1981. Contract AC01-78EI06409. 232p. NTIS, PC A11/MF A01; 1; GPO Dep. Order Number DE84012406.

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REGSHARE is a top down regional distribution model which allocates national macroeconomic data to state and regional disaggregations. The allocation to the individual state of national economic activity is based on the past and projected state proportion (share) of the national total. REGSHARE outputs are currently used by EIA as inputs for the Regional Demand Forecasting Model (RDFOR) of the Mid-term Energy Forecasting System (MEFS). REGSHARE consists of three independently executable programs projecting regional population, regional value added by manufacturing sector, and regional personal disposable income, respectively. The REGSHARE programs are written in Matrix Arithmetic Programming Language (MAPS).

30993 **(DOE/EIA—0385(83)) Synopsis of the Annual Energy Review and Outlook, 1983.** (USDOE Energy Information Administration, Washington, DC). May 1984. 28p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012788.

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Energy production, consumption, and exploration statistics are reviewed. Domestic energy production declined for the third consecutive year, 4.4% below the 1982 level. The fall in natural gas and coal production accounted for the decline. During the period 1972 through 1983, the pattern of energy production shifted considerably. The production of coal, nuclear power, and hydropower increased from 28.0% of total production to 39.4%. During this period, petroleum, natural gas, and natural gas plant liquids production declined from 71.9% of the total to 60.4%. After declining in 1982 for the first time since World War II, electricity generation increased in 1983 to a record high of 2.31 trillion kilowatt-hours. Domestic energy consumption declined for the fourth consecutive

year, 0.5% below the 1982 level and 10.6% below the peak level during 1979. Petroleum consumption, which peaked in 1978 at 18.8 million barrels per day, was only 15.2 million per day. Only natural gas consumption was down significantly from 1982. Per capita energy consumption fell for the fifth straight year, to 301 million Btu, the lowest level since 1967, reflecting the continuing conservation. The mix of fossil fuels used to produce electricity shifted over the past 30 years. During the 1950's and 1960's, petroleum and natural gas produced increasing shares of electricity, but, from 1972 through 1983, the combined petroleum and natural gas share fell from 37 to 18% of total generation, while the coal portion rose from 44 to 55%. Dependence on foreign petroleum sources was reduced for the fourth consecutive year. Net imports in 1983 equaled 28% of consumption, the lowest since the last full year of import controls, in 1972. Changes in energy prices in 1983 were mixed. Most petroleum prices dropped, but natural gas, coal, and electricity prices increased.

30994 **(IFE/KR/E—4) District heating model for use in regional energy planning. Thesis in cybernetics.** Halse, T. (Institute for Energy Technology, Kjeller (Norway)). Jan 1982. 158p. (In Norwegian). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84751456.

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The thesis describes the development of two computer programs for use in the planning of district heating networks. One of the programs is a computer simulation of the distribution network. Internal representation of the network is done by graphs and algorithms based on the Steiner minimal tree principle. This simulation model is intended to be of help in minimizing the cost of the total district heating network and in finding where it is profitable to place pipes. The program will primarily be useful for the planning of new development areas. The other program is used for dimensioning the pipes in the distribution network and for calculating the yearly minimum cost. The program may be used for studying the effects of alternative places for the heating centres and the effects of altering the number of consumer groups connected to the network. The program may also be used for simulating the operation of district heating installations for a year or for a period of 20 to 30 years. The program is tested in a region with a project using waste heat from the industry (Skien-Porsgrunn region). The results were in good agreement with calculations carried out by conventional methods. The models have limitations such as the fact that the two codes cannot be used simultaneously in the computer because of memory requirements. The heat production unit is not included in the model. The program description is not included in the report. 55 drawings, 13 tables.

30995 **(NP—4770284) Switzerland - energy situation 1982.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Feb 1984. 38p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84770284.

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The energy situation of Switzerland is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade and the balance of payments.

2902 Economics And Sociology

REFER ALSO TO CITATION(S) 30239, 30242, 30992, 30994, 31028

30996 **(AECL—7831) QA success stories.** Maxwell, R.B. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jul 1982. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701911.

Many manufacturers who have implemented quality programs are claiming substantial benefits from them. They consider costs due to quality in the same light as design development or manufacturing improvement, as an investment. Benefits include reduced scrap, rework and warranty claims and increased sales. They have proven that a strong quality program can have a very positive financial impact on a business.

30997 (CONF-8008175—, pp 35) **Role of the energy problem in the North-South relations.** Freymond, J. 1982. (In German and French). NTIS (US Sales Only), PC A03/MF A01. Order Number TI84770281.

From VSE general meeting; Geneva, Switzerland (22 Aug 1980).

In this popular presentation, a few basic problems are discussed which have resulted from disruptions of economic progress after 1973, particularly in industrial nations. The West is sure to have means for coping with the transition period, and for finding a way leading from one dominating source of energy to a diversified energy system. Until now, the interdependencies of factors involved and lacking determination have prevented this imperative change from taking place.

2903 Environment, Health, And Safety

REFER ALSO TO CITATION(S) 30491, 30683, 31013, 31678, 31679, 31680, 31682, 31703, 31723, 31724

30998 **(EPRI-EA—3193-Vol.1) Decision framework for ambient air quality standards. Volume 1. Methodology and model structure. Final report.** Cohan, D.; North, D.W.; Wilson, D.S. (Decision Focus, Inc., Los Altos, CA (USA)). May 1984. 78p. Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920389.

This report describes a decision framework for ambient air quality standards. The framework represents the key relationships linking ambient concentration to exposure and exposure to health or welfare effects. Critical uncertainties in these relationships can be incorporated explicitly in an analysis using the decision framework. Analyses can be carried out at an aggregate level, or can be broken down by any combination of geographic zone, time period, population group, activity pattern, and effects categories. The decision framework has been implemented as a computer program which is documented in a user's guide, which is Volume 2 of this report. 32 figures.

30999 **(PB—84-121383) National Emissions Data System (NEDS) fuel use report, 1981.** (Environmental Protection Agency, Research Triangle Park, NC (USA). Office of Air Quality Planning and Standards). Jan 1984. 135p. (EPA—450/4-83-023). NTIS MF A01.

See also PB82-239385.

This report summarizes annual estimates of total consumption of major fuels such as coal, fuel oil, natural gas, gasoline, and diesel fuel. Estimates of the consumption of a number of other comparatively minor fuels are also included. The data are distributed according to major categories of air pollutant emissions sources and are reported for the nation as a whole and for individual states, territories, and the District of Columbia.

2904 Natural Resources

REFER ALSO TO CITATION(S) 30543, 31702

31000 **(DOE/CS/69104—7) Conserving flush toilet water use.** (Michigan Dept. of Commerce, Lansing (USA)). Mar 1984. Contract FG45-80CS69104. 8p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012705.

This publication describes methods to help reduce toilet water consumption through low-cost/no-cost conservation measures. It demonstrates typical use of water and how to calculate potential savings of toilet tank water displacement mechanisms. An overview of various water conservation techniques is presented.

31001 **(GAO/RCED—84-63) Implementation of the national minerals and materials policy needs better coordination and focus.** Bowsher, C.A. (General Accounting Office, Washington, DC (USA). Office of the Comptroller General). 20 Mar 1984. 49p. General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20760. Order Number TI84901116.

GAO monitored and evaluated the administration's implementation of the National Materials and Minerals Policy, Research and Development Act of 1980. GAO concludes that: the mechanism established by the administration to ensure timely, high-level consideration of important minerals and materials policy issues has not provided the continuous decision and policy coordination required by the act; and the administration's response to the act's multiple reporting requirements has focused primarily on national security without adequately addressing the act's other two policy goals of economic well-being and industrial production. Recommendations address these issues.

31002 **(OTA-C—10) Technology assessment of materials information systems. Aluminum case study.** Wobber, F.J. (International Business Machines Corp., Gaithersburg, MD (USA). Federal Systems Div.). 2 Feb 1976. 80p. NTIS, PC A05/MF A01. Order Number DE84901039.

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As part of a technology assessment of materials information systems, surveys were conducted of the materials community. Primary attention was given to testing the quality of data bases which are an important part of the existing materials information system. The surveys were conducted within the aluminum-related segment of the materials community and were supportive of the total assessment process. This report is the consolidation of the results of contacts within the materials community which contributed to the conclusions drawn in the total assessment.

31003 **(OTA-C—10-Vol.1-Summ.) Technology assessment of materials information systems. Volume I. Summary. Final report.** Gorschboth, F.F.; Wobber, F.J. (International Business Machines Corp., Gaithersburg, MD (USA). Federal Systems Div.). 2 Feb 1976. 95p. NTIS, PC A05/MF A01. Order Number DE84901036.

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Undertaken at the request of the House Committee on Science and Technology, the technology assessment comprised four related studies. Two of these, by IBM and George Washington University, addressed overall problems posed by materials shortages. Their conclusions, reported here, are based on an extensive series of interviews with information specialists and materials decision-makers and on analyses of prior major studies.

31004 **(PB—84-146190) World oilseed situation and US export opportunities, November 1983. Foreign agriculture circular.** (Foreign Agricultural Service, Washington, DC (USA)). Nov 1983. 61p. NTIS, PC A04/MF A01.

See also PB84-120708.

Tight supplies have continued to dominate the oilseeds and products situation since the October report, with estimated world oilseed production (including flaxseed) dropping by half a million tons. Increased projections of world soybean and peanut supplies were more than offset by reduced estimates of cottonseed output, as well as smaller reductions in prospective sunflower and rapeseed output. Forecast protein meal consumption dropped slightly from last month's level; forecast vegetable oil consumption also dropped slightly from last month's level.

31005 **(PB—84-146216) World oilseed situation and US export opportunities, June 1982. Foreign agriculture circular.** (Foreign Agricultural Service, Washington, DC (USA)). Jun 1982. 64p. NTIS, PC A04/MF A01.

See also PB84-120708.

World oilseed output for 1982/83 is forecast at 175 million tons, unchanged from May, but up 2.2 million tons from 1981/82. World soybean production for 1981/82 remains unchanged from last month's estimate. Export estimates for soybeans for both Argentina and the United States were adjusted upward to reflect recent activity. U.S. exports of soybeans for 1981/82 are forecast at 24.5 million tons, 3 percent above the record in 1979/80. Spain has tendered for at least 20,000 tons of sunflowerseed oil and could possibly be in the market for sunflowerseed in the near future. Mexico's increasing use of oilseeds and reduced safflower and cottonseed production has also stimulated significant imports of U.S. sunflowerseed. Trade barriers and policies: Japan announced various measures to liberalize imports in May. These include tariff reductions on 4 oilseed products.

31006 **(PB—84-150275) Evaluation of four completed small watershed projects: South Carolina, Maryland, Idaho-Nevada, and West Virginia. Agricultural economic report.** Sutton, J.D. (Economic Research Service, Washington, DC (USA). Natural Resource Economics Div.). Nov 1974. 66p. (AER—271). NTIS, PC A04/MF A01.

This study was designed to determine the efficacy of the planning process and in four operating small watershed projects. A qualitative appraisal was made of actual performance and costs, which were then compared with work plan projections. Particular attention was paid to factors, as reported by project beneficiaries and leaders of local sponsoring organizations, that affected the size and composition of these realized values.

2905 Research, Development, Demonstration, And Commercialization

REFER ALSO TO CITATION(S) 30176, 30996, 31025, 31682

31007 **(AERE-PR-NP—30) Nuclear Physics Division progress report. For the period 1st January to 31st December 1982.** West, D.; Cookson, J.A.; Findlay, D.J.S. (eds.). (UKAEA Atomic Energy Research Establishment, Harwell. Nuclear Physics Div.). Jul 1983. 159p. NTIS (US Sales Only), PC A08/MF A01. Order Number DE84701819.

Summaries are given of work on nuclear data and technology for nuclear power; nuclear reactions and nuclear properties; applications of nuclear and associated techniques in a variety of fields, particularly with the use of ion beams; accelerator operation and development.

31008 **(AFME-RA—1982) 1. Progress report 1982.** (Agence Francaise pour la Maitrise de l'Energie, 75 - Paris). 1983. 48p. (In French). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84751547.

This progress report presents the basic aims of the AFME (Agence Francaise pour la Maitrise de l'Energie/French Agency for Energy Conservation) in the different fields of industry, agriculture, construction, solar applications, public equipments, as also education of adults and children.

31009 **(DOE/RG/10347—T4) Annotated archive of diffusion references: empirical and theoretical works.** Crano, W.D.; Ludwig, S.; Selnow, G.W. (eds.). (Michigan State Univ., East Lansing (USA). Center for Evaluation and Assessment). Jun 1981. Contract AC01-80RG10347. 450p. NTIS, PC A19/MF A01; 1; GPO Dep. Order Number DE84012194.

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The Diffusion Archive is the most recent compilation of the prolific research and writings on social change processes. The diffusion process is defined as the acceptance, over time, of specific ideas, practices, or products by individuals, groups, organizations, and societies. (DLC)

31010 **(IAEA-TECDOC—293) International Centre for Theoretical Physics: scientific activities in 1982.** (International Atomic Energy Agency, Vienna (Austria)). Aug 1983. 57p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701912.

Research and training-for-research were carried out in the following areas: physics and energy (nuclear physics, solar energy), physics and frontiers of knowledge (elementary particles and fundamental theory), physics of the living state, physics and technology (condensed matter physics), applicable mathematics and planning models (applicable mathematics, mathematical ecology), physics of the environment and of natural resources (geomagnetism, ionospheric and magnetospheric physics, atmospheric physics), and physics and development. Activities included both research at the Centre and a number of workshops and symposia. The subjects treated are briefly summarized, and references to preprints and internal reports are given.

2906 Nuclear Energy

REFER ALSO TO CITATION(S) 30322, 30333, 30845, 30944

31011 **(CNEN-NE—3.04) Authorization for the functioning of service laboratories for personal monitoring.** (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). Oct 1981. 12p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701908.

The requirements of the Brazilian CNEN (Comissao Nacional de Energia Nuclear) are established for the construction licensing and operation authorization of laboratories offering personnel monitoring services for external exposures to X-and gamma radiation.

31012 **(EPRI-NP—3480) Nuclear unit operating experience: 1980 through 1982 update. Final report.** Koppe, R.H.; Olson, E.A.J.; LeShay, D.W. (Stoller (S.M.) Corp., Boulder, CO (USA)). Apr 1984. 192p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920336.

This report presents results of a project conducted by the S.M. Stoller Corporation for EPRI. The purpose of the project was to analyze the operational experience of nuclear units within the United States during the calendar years 1980 through 1982 using the Operating Plant Evaluation Code (OPEC-2) system and other available sources of operational data. The report updates and supplements previous EPRI reports NP-1191 and NP-2092. The overall performances of US nuclear units and the availability and capacity factor losses for the constituent systems and components are presented. The problem areas which have impacted most significantly on nuclear unit performance during 1980 to 1982 are discussed in detail. The 69 nuclear units which were considered in this report include all units which are rated 400 MW(e) or greater.

31013 **(GAO/RCED—84-50) DOE's safety and health oversight program at nuclear facilities could be strengthened.** (General Accounting Office, Washington, DC (USA). Resources, Community and Economic Development Div.). 30 Nov 1983. 39p. US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760. Order Number TI84901112.

Report to The Honorable Patricia Schroeder, House of Representatives.

The Department of Energy has made improvements in its safety and health program since GAO's 1981 report on this subject. However, these improvements have been made on an individual basis and the major cause of the problems has not been addressed. Ensuring that safety, health, and environmental standards are met rests with contractors who operate DOE's nuclear facilities. The contractors are also responsible for meeting production or program objectives. Thus, safety and health concerns are pitted against program goals. GAO continues to believe, as stated in its 1981 report, that a major reorganization could provide DOE's safety and health organization with the authority and independence necessary for an effective safety and health program at DOE's nuclear facilities.

31014 **(INIS-mf—8925) Agreement between the Government of Canada and the Government of the Republic of Indonesia concerning the peaceful uses of nuclear energy.** (International Atomic Energy Agency, Vienna (Austria)). Jul 1982. 32p. (In English, French). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780285.

This agreement provides for the transfer of nuclear technology and materials between Canada and Indonesia subject to the terms of the Non-Proliferation Treaty and other safeguards.

31015 **Risk of producing energy - and conserving it.** Inhaber, H. (Oak Ridge National Lab., TN (USA)); Caton, G.; Gove, R. pp 217-230 of Uranium and nuclear energy: 1981. Proceedings of the Sixth International symposium held by the Uranium Institute, London, 2-4 September 1981. London, England; Butterworth Scientific Limited (1982). (CONF-810965—).

From 6. international symposium of the Uranium Institute; London, UK (2 Sep 1981).

In this paper the risks of 11 different energy systems are compared. In calculating such risks the number of deaths per man hour involved in the fabrication of materials, plant construction, the trades involved and the risks to the public from catastrophic events, calculated on theoretical and historic events, are taken into consideration. Risks in energy conservation are also discussed and the risks involved in saving energy by efficiently sealing houses is studied. This risk proves a greater risk than the public risk from nuclear power.

2908 Waste Heat Utilization

REFER ALSO TO CITATION(S) 30592, 30994, 31056, 31106

31016 **(DOE/CS/40117—T2) Market development for advanced coal-based cogeneration systems by the year 2000. Final report.** (Resource Planning Associates, Inc., Washington, DC (USA)). 22 Dec 1980. Contract AT03-76CS40117. 92p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012774.

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In its drive to improve US energy security, the federal government has instituted programs to conserve energy by encouraging the use of alternative fuels and energy-efficient technologies. Policymakers have paid considerable attention to increasing industry's use of cogeneration technologies because these systems can meet on-site requirements for process steam and electricity using much less oil and gas than with an on-site boiler and purchased electricity. In addition, cogeneration technologies that burn alternative fuels such as coal and coal-derived liquids could hasten the progress toward national energy objectives. To assess the potential market development for process steam and electricity that advanced coal-based cogeneration technologies could achieve over the 1985-2000 period, we built an economic model to simulate competition among 17 advanced coal-based cogeneration systems. We evaluated market response to competing cogeneration technologies under three economic scenarios: (1) industrial ownership with no power export; (2) industrial ownership with power export; and (3) utility ownership. The total market development by the year 2000 changes significantly under each of the three scenarios. Market development is highest under utility ownership (9000 MW) because utility return on investment requirements are lower than those of industry. The second highest development (5970 MW) occurs under industry ownership with power export because industrial cogenerators can sell excess electricity to outside users, which provides additional revenue. The least market development (5275 MW) takes place under industry ownership with no power export. The share of total development that advanced coal-based systems capture follows the same pattern.

2910 Conservation

REFER ALSO TO CITATION(S) 30994, 31008, 31020, 31053, 31060, 31063, 31064, 31071, 31072, 31073, 31074, 31075, 31076, 31077, 31079, 31080, 31109

31017 **Residential energy use and conservation in Denmark, 1965-1980.** Schipper, L. (Applied Science Division, Lawrence Berkeley Laboratory, University of California, Berkeley, CA). *Energy Policy;* **11**: No. 4, 313-323(Dec 1983). Contract AC03-76SF00098.

New data have been assembled to quantify patterns of residential energy use in Denmark from 1965 to 1980 by fuel and end use. Indicators of the structure and intensity of energy use are developed from basic data and reviewed. Changes since 1972 are quantified and compared with those observed in other countries. The reduction in oil use in oil-heated dwellings is shown to be the largest among OECD countries. Elements of past, present and future Danish conservation policies are reviewed. While many of these are unique and far reaching, the predominant cause of conservation up until 1980 has been short-term measures stimulated primarily by higher energy prices.

2920 Supply, Demand, And Forecasting

REFER ALSO TO CITATION(S) 30240, 30241, 30992, 30994, 31017, 31073, 31079, 31081

31018 (CONF-8008175—, pp 35) **President's address to the VSE general meeting, Geneva, August 22, 1980.** Schulthess, H. von. 1982. (In German and French.). NTIS (US Sales Only), PC A03/MF A01. Order Number TI84770281.

From VSE general meeting; Geneva, Switzerland (22 Aug 1980).

In this address special incidents which happened in the power supply of Switzerland in 1979/1980 are reported in conjunction with a forecast on problems of future energy supply. In the process, supply security, reserves, problems of proving need, and nuclear energy use are dealt with.

31019 **(DOE/EIA—0383(83)) Annual Energy Outlook 1983 with projections to 1995.** (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). May 1984. 315p. NTIS, PC A14/MF A01; 1 - GPO; GPO Dep. Order Number DE84012161.

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Yearly projections through 1995 of the consumption and supply of energy by fuel and end-use sector are provided for members of Congress, the Administration, and the public. Despite 3 years of conflict by two countries that control roughly 15 percent of OPEC production capacity, the current outlook is for slight declines in the average world price for oil for the next 2 to 3 years, and then for a gradual rise in the real price of oil to about the levels of 1980 by the early 1990's. Higher growth in oil demand or slower expansion of oil production capacity could produce higher oil prices, while greater conservation and increased competition among oil producers could result in lower prices. This more optimistic outlook for oil prices has been adopted because the expected recovery of world economic growth has not been sufficient to offset other factors that hold down demand for oil. Both Europe and the United States have had the blessing of two mixed but essentially warm winters that moderated usual seasonal peaks in oil demand and kept markets slack. Moreover, conservation continues to moderate the total demand for energy, particularly petroleum, as efficiency of use continues to increase in response to the past 10 years of higher energy prices. It now appears far less likely than it did last year that the gas industry will be faced with a massive loss of market in the 1980's. It appears that the natural gas tariff structure is being modified to retain large industrial and utility customers that are readily able to switch fuels. Thus, this year's wellhead gas price forecast shows only very slight increases until the price of fuel oil increases in the late 1980's. The rapid increase in gas prices upon partial decontrol in 1985 is no longer expected. Finally, it appears that the trend to electrification will continue, although only at about half the rate of the early 1970's. 43 figures, 37 tables. (DMC)

31020 **(DOT-I—83-19) Transportation energy contingency planning: emergency fuel storage.** O'Sullivan, B.; Dewey-Swyer, J. (Municipality of Metropolitan Seattle-METRO, WA (USA)). Jan 1983. 142p. NTIS, PC A07/MF A01. Order Number TI84901214.

This report presented a detailed three-stage planning methodology to help transit managers assess and fulfill their emergency fuel supply requirements. Beginning with the inventory of all existing supply mechanisms, key steps useful for screening alternative reserve storage and emergency supply arrangements were outlined. Potential advantages and disadvantages associated with these alternatives were subjected to discussion and analysis.

31021 **(KFA-STE-IB—3/82) Electric power utilization for the space heat market of households facilitating petroleum substitution.** Plewnia, M. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung). Aug 1982. 144p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84751252.

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Within the framework of a state-of-the-art analysis the structure of heat consumers is investigated. The factors determining the heat demand of households are closely examined. Apart from constructional facts the temperature behaviour of outside air plays a main part. The global investigation performed here is based on the determination of average specific heat demand values for one-family and multi-family houses. In the next chapter the party representing the heat demand is contrasted with the power plant party supplying heat in the form of electric power and its structural development in the past. The hourly behaviour of electric power production is important for the evaluation of substitution potentials as it is the only factor which permits any conclusions to be drawn from regarding free power plant capacities. In order to be able to make statements on the number of heating systems operating on electric power in the prospect of the year 2000 the possible future development of the total electricity demand and the specific heat demand characteristics for two different building types are presented. In dependence of the seasonally varying load characteristics and thus of differing still available power plant performances the potential of residential units is finally determined which, on the basis of electric energy, could be supplied with space heat directly with space electric heating or indirectly by electric heat pumps.

2930 Policy, Legislation, And Regulation

REFER ALSO TO CITATION(S) 30153, 30224, 30845, 31001, 31014

31022 **(DOE/NBM—4012820) Appraisal and analysis of opportunities for a joint DOE/DOD energy demonstration program. Final report.** Ziem, R.W. (Pyros, Inc., Gaithersburg, MD (USA)). May 1980. Contract W-31-109-ENG-38. 110p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012820.

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The basic objective of this study was to assess the potential for cooperative projects between the Department of Energy (DOE) and the Department of Defense (DOD) in areas concerned with the development of Total Energy (TE) Systems and to do the groundwork and liaison necessary to initiate those projects. The scope of the potential joint projects includes cooperative effort in the development and test of a variety of heat engines (prime movers) capable of utilizing coal as well as synthetic liquid fuels derived from coal and oil shale; as well as the indication of potential Military Department sites which would be suitable for the demonstration of TE systems based on a variety of such prime movers. In order to accomplish the objective of the study, it was necessary to review a large number of DOD studies and plans and to discuss the objective of the TETAS studies with a large number of Military Department people. The DOD recognizes the requirement for an assured energy supply and the need to learn how to use the synthetic fuels from coal and shale being developed by the DOE. The need to modify engine systems to adapt them to differing fuel characteristics and make those engines more flexible relative to the range of fuels they will accept is clear. What is not so clear is the fact that the DOD has a much greater opportunity to conserve energy in now inefficient facility operations than it has in mobility operations which must continue to stress mission and high performance. This report indicates guidelines for the conduct of joint projects between the DOE and the DOD which can aid both in meeting their energy objective.

31023 **(NP—4770321) Saudi Arabia - energy situation 1982.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Feb 1984. 22p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770321.

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The energy situation of Saudi Arabia is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade and the balance of payments.

2940 Fossil Fuels

REFER ALSO TO CITATION(S) 30176, 30177, 30218, 30225, 30229, 30229, 30230, 30239, 30240, 30241, 30242, 30244, 30246, 30248, 30248, 30249, 30249, 30252, 30257, 30683, 31079

31024 **(DOE/ET/60004—T6) Development of an analytical framework to assess the role of new technologies for liquid and gaseous fuels. Volume I. Background. Final report.** Marshalla, R.A.; Nesbitt, D.M.; Sullivan, S.J. (Decision Focus, Inc., Palo Alto, CA (USA)). Mar 1980. Contract AC05-79ET60004. 324p. NTIS, PC A14/MF A01; 1; GPO Dep. Order Number DE84011239.

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A central issue in liquid and gaseous fuel R and D is how long conventional oil and gas will last. This volume investigates that issue by exploring the methodologies used to characterize the domestic base of oil and natural gas including detailed reviews of recent resource models and their applicability to the problem of R and D policy analysis in liquid and gaseous fuels. Detailed reviews and comments are made on 9 studies on enhanced oil and gas recovery and its potential, leasing strategies and schedules for the Outer Continental Shelf, and energy models. 38 figures, 19 tables. (DMC)

31025 (NP—4751453, pp 27-34) **Future perspectives of oil and natural gas activities in the Danish part of the North Sea.** Enggaard, K. 1982. (In Danish). NTIS (US Sales Only), PC A12/MF A01. Order Number TI84751453.

In Norwegian-Danish offshore 82. Report.

Perspectives of oil-gas recovery from the Danish offshore operations in North Sea are estimated as promising. Private enterprise DUC is the largest investor, its operation cost being 0.7-1.0 milliard Dkr per year 1985-86, with increasing trend as new fields will be developed. The public sector is represented by DONG A/S which has constructed pipelines for petroleum and gas distribution. A number of lots will be bidden by the state, 47 companies have shown interest for concessions in preliminary unofficial contacts.

31026 (NP—4751453, pp 189-200) **Plans of Statoil future offshore activities including Statoil investment plans. Statoil wholesale policy.** Daastoel, H.M. 1982. (In Norwegian). NTIS (US Sales Only), PC A12/MF A01. Order Number TI84751453.

In Norwegian-Danish offshore 82. Report.

The Norwegian Statoil company is state-owned in about 50% and it is operating for 11 licenses as well as for development and management of Statpipe gas-pipe distribution sytem on the Norwegian shelf. Statoil main tasks are exploratory drilling, field developing, transportation and production of oil products.

31027 **(UCID—19955) Research topics in coal utilization.** Truhan, J.J.; Lucht, L.M.; Piwinskii, A.J.; Taylor, R.W. (Lawrence Livermore National Lab., CA (USA)). 12 Dec 1983. Contract W-7405-ENG-48. 28p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012381.

Some specific research topics are described that would improve the understanding of coal utilization and match facilities and expertise that currently exist at LLNL. Areas discussed include: fouling, slagging, and metal corrosion; and the characterization, pyrolysis and combination of sulfur species in coal. (LEW)

2950 Hydrogen And Synthetic Fuels

REFER ALSO TO CITATION(S) 30144

31028 **Synthetic fuel development Potential socioeconomic impacts of single and multiple projects.** Schweitzer, M.; Braid, R.B.; Carnes, S.A.; Soderstrom, E.J. (Oak Ridge National Laboratory, Oak Ridge, TN). *Energy Policy;* **11**: No. 4, 333-345(Dec 1983).

As a result of the perceived vulnerability of the USA due to dependency on foreign petroleum supply sources, both public and private agencies have sought to speed the development of synthetic fuels. Given the concentration of the necessary natural resources, such development is likely to have significant social consequences. In this paper, the authors draw upon experience gained in conducting social impact analyses on six proposed Department of Energy demonstration facilities. Attention is focused on the cumulative impacts anticipated in the region surrounding the Newman, Kentucky, site of the Solvent Refined Coal-I project. The authors offer generalizations about community impacts and policy implications, relevant not only to synthetic fuels but also to other high technology energy systems.

2960 Electric Power

REFER ALSO TO CITATION(S) 30684, 31406, 31724

31029 **(CONF-8004124—2) Patterns of outsiting by US electric utilities.** Hillsman, E.L.; Alvic, D.R. (Oak Ridge National Lab., TN (USA); Lockheed Corp., Oak Ridge, TN (USA)). 1980. Contract W-7405-ENG-26. 41p. NTIS MF A01; 2; GPO Dep. Order Number DE84007609.

From 12. annual meeting of the Mid-Continent Regional Science Association; Lincoln, NB, USA (24 Apr 1980).

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Comparison of the service areas of US electric utilities with the locations of electric power plants reveals a substantial number of plants outside the boundaries of the areas they serve. This outsiting separates the negative attributes associated with the plants from the recipients of the benefits of power generation, within the service areas. We examine regional and temporal variation of the national pattern of outsiting and hypothesize several processes that may account for the variation. The methodology reveals relatively little separation of benefits and costs in the Southeast, with its large service areas and balanced distribution of good power plant sites. The outsiting pattern in the Northeast reflects small service areas, high population densities, and a complex pattern of utility ownership and organization. The pattern within the Ohio River basin appears to reflect a process of depleting the region's resource of good power plant sites. Much of the pattern in the Southwest appears to result from various policies adopted by the State of California. The results presented are from the exploratory phase of a larger study that will use several methodologies and scales of analysis, and the paper discusses some of the work planned for the larger study.

31030 **(DOE/EIS—0031-F) Bonneville Power Administration: 1979 wholesale rate increase. Final environmental impact statement.** (USDOE Bonneville Power Administration, Portland, OR). Oct 1979. 332p. NTIS, PC A15/MF A01; 1; GPO Dep. Order Number DE84011246.

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The action proposed is an increase of approximately 90 percent in Bonneville Power Administration's wholesale power rates to a level sufficient to meet fiscal payout requirements and recover costs. The action also involves a restructuring of existing rate schedules. States involved are California, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

31031 **(DOE/IE—0003) Electric power supply and demand for the contiguous United States 1984-1993. Staff report.** (USDOE Assistant Secretary for International Affairs and Energy Emergencies, Washington, DC). Jun 1984. 214p. NTIS, PC A10/MF A01; 1; GPO Dep. Order Number DE84012894.

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The projected annual growth rate of electric power demand and generating capacity for the period 1984-1993 is less than the growth rate projected a year earlier for the period 1983-1992. Bulk power supply in general, for the period 1984-1993, is projected to be adequate for meeting projected peak demands. Continued reliability of power supply depends upon adherence to current schedules for new generating units and transmission facilities and the continued utilization of sound system operating practices by the bulk power industry.

31032 **(DOE/RG/10347—T2) Non-technical introduction to the planning, implementation, and evaluation of utility communication programs.** Scheiner, E.; Ludwig, S.; Crano, W.D.; Selnow, G.W. (eds.). (Michigan State Univ., East Lansing (USA). Center for Evaluation and Assessment). Jun 1981. Contract AC01-80RG10347. 61p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84012148.

When a utility reaches out to the public, its message must be transmitted in an appropriate form through the proper media if it is to be favorably received and understood. Without a high level of public awareness and comprehension, the desired change in public attitudes and behavior are not likely to be attained. Are utilities selecting the right topics for communication to their customers. Are they employing the correct media to achieve their communication goals. Do their plans and strategies accurately reflect their real needs for public understanding. This booklet seeks to provide some brief and nontechnical answers to these questions. We describe and discuss the communications process as it applies to utilities and their various publics.

31033 **(DOE/SWP—0001/2) 1983 annual report for the Southwestern Federal Power Systems.** (USDOE Southwestern Power Administration, Tulsa, OK). 1984. 36p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012757.

For the second consecutive year, Southwestern Power Administration (SWPA) in fiscal 1983 was able to make a substantial payment on its outstanding indebtedness to the US Treasury for the construction of the Southwestern Federal Power System. Revenues that were $10,195,555 higher than operating and maintenance expenses were used for this purpose. One of the successes of the year was the rapid approval by the Federal Energy Regulatory Commission (FERC) of a requested 38-percent system-wide rate increase. A 23-percent increase for the isolated Sam Rayburn Dam project was approved by the FERC in only six weeks. Another important factor in the rate increase was participation in the rate study by representatives of SWPA's customers. Their participation contributed to a decision to establish a reserve account for purchased power.

31034 **(EPRI-EA—1672-Vol.5) Regional load-curve models. Volume 5. Data base. Final report.** Platt, H.D. (Northeastern Univ., Boston, MA (USA). Coll. of Business Administration). Apr 1984. 46p. Electric Power Research Institute-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920320.

In preparing to build the models detailed in the first four volumes of the EA-1672 reports, a substantial data gathering, cleanup, and organizing effort was conducted. This volume describes that process and documents the data banks sent to EPRI. Three types of data concepts were needed to explore hourly load forecasting: hourly load, hourly weather and related socioeconomic data concepts. These materials were gathered for the project. EPRI has 32 data tapes that include hourly load and weather data for 32 regions for the period 1962 to 1977. Two other data banks, EPRIDATAA and EPRIDATAM, contain annual and monthly data respectively, gathered for use in this project. Hourly load forecasts out to the year 2000 have also been received by EPRI. DRI's forecasts are contained in the data bank FORECASTBANK. QUERI's forecasts are also available. These data series may prove useful to other researchers exploring related topics.

31035 **(EPRI-EA—3464) Workshop proceedings: planning and assessment of load management.** (Battelle Columbus Labs., OH (USA)). May 1984. 328p. (CONF-821267—). EPRI-RRC Box 50490, Palo Alto, CA 94303. Order Number TI84920361.

From EPRI workshop on planning and assessment of load management; San Antonio, TX, USA (8 Dec 1982).

Load Management within the context of the seminar included all utility programs that either directly or indirectly are intended to modify customer usage patterns principally in the direction of reducing system peak load and shifting consumption from peak to off-peak periods. Purpose of the seminar was to promote an active exchange of information among technical analysts at electric utilities and regulatory commissions on recent advances in analytical techniques directed at planning and assessing load management programs. A secondary purpose was to identify new areas of research that need to be addressed by EPRI. The seminar featured presentations by leading researchers and practitioners in a multidisciplinary approach to such issues as customer attitudes and acceptance, forecasting system load shape impact, implementation, and hardware research. In addition to the formal presentations, the seminar featured several small-group discussion sessions on selected topics.

31036 **(EPRI-EA—3467) Selected statistical methods for analysis of load research data. Final report.** Limaye, D.R.; Whitmore, C. (Synergic Resources Corp., Bala-Cynwyd, PA (USA)). May 1984. 197p. EPRI-RRC Box 50490, Palo Alto, CA 94303. Order Number TI84920328.

Objective was to explore the application of innovative statistical methods for the analysis of utility load data. A number of applications were conceptualized and some of these were tested using typical utility load research data. A probabilistic model of utility loads, which treats loads as random variables, has been postulated. In addition, the following topics have been addressed: use of probability distribution functions for evaluating load research data; procedures for aggregating load distributions; use of cluster analysis techniques for grouping customers with similar load shapes; statistical problems in the analysis of peak loads; and effects of measurement time interval and aggregation on estimates of peak loads.

31037 **(EPRI-EA—3506) Industrial response to time-of-use rates: quantitative analysis of French, English and Welsh data. Final report.** Acton, J.P.; McKay, D. (RAND Corp., Santa Monica, CA (USA)). May 1984. 81p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920418.

This report examines the response to time-of-use (TOU) electricity rates by large industrial and commercial customers in France, England, and Wales. The report analyzes quantitatively the daily and seasonal patterns of electricity use for a sample of customers who have faced TOU rates for 10 to 20 years. The analysis takes account of differences in industrial mix from one system to another and of the presence of cogeneration capability by the customers. In the case f the British data, the effect of an interruptible rate is also examined. The steady-state nature of these data permit analysts to observe adjustments that may include new capital additions or long-term experience that may not be available in US data for several more years.

31038 **(EPRI-EA—3507-Vol.3) Industrial process models of electricity demand. Volume 3: The iron and steel industry. Final report.** Pierce, B.L.; Sparrow, F.T.; Pilati, D.A. (Brookhaven National Lab., Upton, NY (USA)). May 1984. Contract AC02-76CH00016. 97p. NTIS, PC A05/MF A01 - EPRI; GPO Dep. Order Number DE84012731.

Brookhaven National Laboratory has developed a process model of the US iron and steel industry. The major steps in steelmaking, from iron ore mining and scrap recycling to the final finishing of carbon, alloy, and stainless steel, are included in the model as are many energy-conserving technology options. Given fuel price and product demand projections, the model projects modes of operation and energy consumption characteristics that minimize the cost of meeting the projected demands. With a 1.5% per year growth in demand, model results show an increase in the purchase of electricity of 2.8% per year and a decrease in energy per ton of product of 1.1% per year from 1980 to 2000.

31039 **(EPRI-EA—3507-Vol.4) Industrial process models of electricity demand. Volume 4. The aluminum industry. Final report.** Pierce, B.L.; Coward, H.; Sparrow, F.T.; Pilati, D.A. (Brookhaven National Lab., Upton, NY (USA)). May 1984. Contract AC02-76CH00016. 100p. NTIS, PC A05/MF A01 - EPRI; GPO Dep. Order Number DE84012733.

The National Center for Analysis of Energy Systems at Brookhaven National Laboratory has developed a process model of the US aluminum industry. The model consists of the major process steps in the manufacture of milled and cast aluminum products and is designed to select modes of operation and energy consumption characteristics that minimize the cost of meeting projected demands for the industry's products. Domestic refineries and primary smelt-

ers are represented individually in the model. Industry structure in terms of plant ownership and allowed transfers of aluminum-bearing materials is explicitly modeled. With a growth in product demand of 4.2% per year, model results show a decline in electricity intensity of primary production.

31040 **(EPRI-EA—3531) Modeling and valuation of utility investments. Final report.** Lyneis, J.M. (Pugh-Roberts Associates, Inc., Cambridge, MA (USA)). May 1984. 113p. EPRI, Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920409.

An electric utility strategic planning model has been used to evaluate a range of investment strategies: (1) conventional baseload capacity expansion; (2) plant life extension; (3) smaller, shorter-lead time plants; (4) peak-load shifting; and (5) no investment in acpacity until some future time, for example 1990. This evaluation has taken two forms: first, a qualitative comparison of the strategies along a number of important measures of interest to utilities, investors, and consumers; and second, a quantitative ranking of the strategies in terms of the present value, at various discount rates, of net cash flow, dividends, and rates of consumers. The evaluation was made in eight different business environments.

31041 **(UT/CES-PR—7) Alternative central-station electric power generation technologies: a consistent engineering-economic framework of comparison.** Baughman, M.L.; Gordon, J.B.; Woodson, H.H. (Texas Univ., Austin (USA). Center for Energy Studies). 1983. 642p. NTIS, PC A99/MF A01. Order Number DE84901196.

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The electric utility sector is an intermediate processing sector of the economy that utilizes the factor inputs of labor, capital, and materials to process and convert chemical, nuclear, and other basic energy forms into electricity. The electricity is then delivered to and consumed by other intermediate or final users for purposes of heating, cooling, lighting, motive power, and materials processing. The economics of electricity supply encompass not only the selection of the basic energy form to be converted but also the selection of possible physical conversion processes to accomplish the conversion. The conversion processes can vary immensely in technical detail, physical configuration, and the basic scientific principle governing their operation. But whatever the design and technical detail, the basic purpose is to process some form of energy and manufacture electricity.

2980 Consumption And Utilization

REFER ALSO TO CITATION(S) 30242, 31008, 31019

2990 Unconventional Sources And Power Generation

REFER ALSO TO CITATION(S) 30482, 30521, 30543, 30547, 31008, 31109

31042 **(PB—84-149616) Elements of some national policies for bio-technology.** (United Nations Industrial Development Organization, Vienna (Austria)). 8 Mar 1982. 11p. NTIS, PC E03/MF E01.

UNIDO pub on national policies in some developed countries regarding biotechnology - covers prospects of a 'biotechnological revolution' affecting many industrial sectors elaboration of national plans of action; government policy summarizes guidelines issued in Canada, UK, USA, France, Japan and Germany FR, as an aid to decision making and the definition of priorities. Additional references: research, education, training, investment.

31043 **(USDA-FS-RP-NC—196) Economic and energy analysis of poplar intensive cultures in the Lake States.** Rose, D.; Ferguson, K.; Lothner, D.C.; Zavitkovski, J. (Minnesota Univ., St. Paul (USA). Coll. of Forestry; Forest Service, Duluth, MN (USA). North Central Forest Experiment Station; Forest Service, Rhinelander, WI (USA). North Central Forest Experiment Station). 1981. 44p. NTIS, PC A03/MF A01. Order Number DE84901046.

Intensive culture of hybrid poplars in the Lake States with our estimates carries substantial risks and does not yield high monetary returns. Intensive culture projects are primarily of interest to industrial users of wood fiber, who can compare them with other sources of supply before making investment decisions. Nonirrigated production strategies are recommended as long as users find our assumptions about irrigation regimes, costs, and obtainable land tract sizes acceptable. Under the conditions specified, irrigating hybrid poplar does not appear economical nor energy efficient. Short-(5 to 10 years) and long-(15 years) rotations differ little in terms of economics and energy efficiency. In view of the uncertainties of some costs and returns that may dramatically affect the economic outlook of a project (specifically, product value, irrigation, need for fertilization, and harvest costs), any initial decision about rotation length for a particular project should be regarded as tentative. If a careful site-specific investigation into irrigation technology and costs and available tract sizes can reveal a more favorable cost picture than we assumed, irrigation alternatives could be more attractive. 20 references, 10 tables.

30 DIRECT ENERGY CONVERSION

3001 Mhd Generators

31044 **(DOE/ET/15614—18) MHD generator component development. Quarterly report, October 1983-December 1983.** (Avco-Everett Research Lab., Inc., Everett, MA (USA)). Feb 1984. Contract AC22-80ET15614. 97p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012773.

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Progress on each of the four tasks is reported. Reduction of test data from Reference Channel No. 3 opertions was completed. Experimental results for pressure recovery of the Mk VI diffuser were obtained. Gas cooling of ceramic sidewall elements was enhanced by use of inserts in the coolant passages. A promising technique for limiting damage resulting from interelectrode arcs may be the use of interelectrode cavities below the gas-side surface. Testing of a new semiconductor device, the Gate Turn Off Switch, was continued. New design criteria were developed for transformers to be used in GTO-based current and consolidation circuitry. Test time for both Mk VI and Mk VII facilities totalled 33-1/2 hours, of which 27 hours were in the Mk VI facility. Only 6.5 power hours were run, due to the large amount of time spent on diagnostics. (WHK)

31045 **(MHD-III—84-045) Coal-fired MHD combustor development project, Phase IIIC. Third quarterly technical progress report, 1 January-30 April, 1984.** (TRW Energy Development Group, Redondo Beach, CA (USA)). 20 May 1984. Contract AC22-83PC60577. 35p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011842.

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The third quarterly technical progress report of the Coal-Fired MHD Combustor Development Project (Phase IIIC) presents the accomplishments during the period 1 January to 30 April, 1984. The scope of work covered relates to those tasks associated with the installation and test of the 50 MW/sub t/ coal combustor under Task 2 and Task 3. Task 3 is an addition to the current Phase IIIC contract. Progress during this reporting period included the following: 1) detail design of the deferred fabrication items such as the PEM have been completed; 2) the installation and cold flow check out of the 50 MW/sub t/ coal combustor was completed; 3) the hot fire check out (Task 2) of the combustor was completed (a total of 5 tests which included vitiator check out tests were performed); and 4) baseline testing of the combustor was initiated under Task 3 and a total of 9 test firings were performed. The measured first stage heat loss ranged between 6.5 and 8.5%, slag recovery between 45 and 66% and carbon utilization was greater than 99.8%. No major hardware or performance related problems were encountered or indicated.

3005 Fuel Cells

REFER ALSO TO CITATION(S) 30120, 30979

31046 **(DOE/MC/20212—1570) Effects of H_2S on molten carbonate fuel cells. Progress report, October 1-December 31, 1983.** Remick, R.J.; Anderson, G.L. (Institute of Gas Technology, Chicago, IL (USA)). Jun 1984. Contract AC21-83MC20212. 47p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012947.

The overall program objective is to identify the poisoning mechanism(s) responsible for performance losses of molten carbonate fuel cells (MCFC) when operating on sulfur-containing gases. This objective is being addressed by focusing out-of-cell and in-cell experiments on single mechanistic issues, followed by incorporation of the results into a model that correlates cell potential decline to contaminant(s) concentration. When coupled with gas cleanup cost projections, the model can be used to conduct trade-off studies leading to the selection of optimum feed-gas compositions for MCFC power plants. The importance of this program is that the degree to which H_2S and other contaminants must be removed from typical MCFC fuels can have a profound effect on the cost of cleaning the fuel gas, especially when contaminant levels lower than 0.1 ppM are required. The anticipated product from the overall program is a justifiable specification for gas cleanup requirements for MCFC power plants. During the second quarter, considerable progress was made in understanding the relationship between gas composition and the poisoning phenomenon. Three bench-scale fuel cells have been operated on the 10% hydrogen/90% helium fuel mixtures this quarter, bringing to four the total number of cells which have operated on this gas. Results reinforce the hypothesis put forth in the last quarterly report that the carbon dioxide and water vapor partial pressures also influence the extent of the poisoning of the fuel cell, not simply the hydrogen sulfide to hydrogen ratio. (WHK)

31047 **Passivation of lithium in acetonitrile solutions of SO_2.** Jaeger, C.D.; Delnick, F.M. (Sandia National Laboratories, Albuquerque, New Mexico). *Proceedings - Electrochemical Society;* **83-1**: 17-26(Oct 1981). (CONF-811013—).

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

The complex impedance of passive lithium electrodes in acetonitrile solutions of SO_2 was measured over the frequency range of 8 kHz to 0.5 Hz. The response of lithium anodes to a galvanostatic pulse was evaluated at different current densities. The response of the lithium electrode to these galvanostatic pulses are related to features of the complex impedance spectrum. The addition of water to the system affected both the complex impedance and pulse behavior of the lithium electrode. A voltage delay was observed only after water had been added to the cell. Other factors such as temperature and passage of current also affect the complex impedance spectrum of the lithium electrode.

31048 **Corrosion problems and materials requirement,s for molten carbonate fuel cells.** Singh, P. (Energy Systems Programs Department General Electric Company, Schenectady, New York). *Proceedings - Electrochemical Society;* **83-1**: 124-139(Oct 1981). (CONF-811013—). Contract AC02-80ET17019.

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

Excessive corrosion of molten carbonate fuel cell hardware has been observed during laboratory-scale cell tests. Problems arising due to such a degradation of materials in fuel cell atmospheres (both fuel and oxidant gases) have been studied and their role in decaying the cell performance have also been examined. In order to develop corrosion resistant materials for cell hardware, both incell and out-of-cell tests were carried out in fuel and oxidant gas atmospheres on several candidate materials. It is evident from these tests that stainless steels experience oxidation, carburization, and hot corrosion type of attack in the anode gas atmosphere leading to comparatively thicker scale growth. In the cathode gas atmosphere, however, corrosion resistance is offered by the formation of protective scale and the absence of scale fluxing. In-cell tests on thermodynamically stable materials (copper and nickel clad stainless steel) in the anode gas atmosphere indicate that copper from the substrate diffuses rapidly into the electrode whereas carbide formation takes place at the nickel/stainless steel interface making the material unsuitable for the long-term application.

31049 **Corrosion of phosphoric acid fuel cell stack components.** Christner, L.; Ahmad, J.; Farroque, M. (Energy Research Corporation, Danbury, CT). *Proceedings - Electrochemical Society;* **83-1**: 140-158(Oct 1981). (CONF-811013—). Contract AC01-78ET13114.

From Electrochemical Society conference; Denver, CO, USA (11 Oct 1981).

Polymers, polymer-coated metals, polymer-graphite composites and different carbon materials are being considered for many of the fuel cell components. Exposure to concentrated phosphoric acid in the fuel cell environment and to high anodic potential results in corrosion. Relative corrosion rates of these materials, failure modes, plausible mechanisms of corrosion and the improvement in corrosion of these materials are discussed.

31050 **Fuel cell cogeneration using anaerobic digester gas.** Hirschenhofer, J.H.; Cutting, J.C.; Piascik, T.M.; Zemkoski, J. (Gilbert/Commonwealth Reading, Pennsylvania). *Alternative Energy Sources;* **7**: 407-423(Dec 1980). (CONF-801210—). Contract AC03-78ET12431.

From 3. Miami international conference on alternative energy sources; Miami Beach, FL, USA (15 Dec 1980).

Gilbert/Commonwealth, in association with Public Service Electric and Gas Company (PSE & G), the Bergen County (New Jersey) Utilities Authority (BCUA) and United Technologies Corporation (UTC), conducted a site specific conceptual design study for the U.S. Department of Energy (DOE) to investigate the technical and economic feasibility of a cogeneration fuel cell power plant (FCPP) operating in a large water pollution control facility. In this particular application, the FCPP would use methane-rich digester gas from the water pollution control facility (WPCF) as a fuel feedstock to provide electrical and thermal energy. Several conceptual designs were evaluated. These conceptual designs were comprised of combinations of options for locating the FCPP at the site, electrically connecting it with the WPCF, supplying fuel to the FCPP, and using the rejected FCPP heat for ownership and operation. A conceptual design was selected which was technically possible, met institutional/regulatory constraints and provided a net cost saving to be shared by BCUA and PSE & G. The displacement of oil and coal resulting from the application was determined. The potential market for nationwide application of the concept was projected along with the equivalent oil displacement resulting from estimated commercial application.

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

REFER ALSO TO CITATION(S) 31008

3201 Buildings

REFER ALSO TO CITATION(S) 30556, 30557, 30558, 30588, 31017, 31021, 31458

31051 **(BMFT-FB-T—83-307) Energy advising in the FR of Germany - methods for estimating the demand of tenants, owners and flat administrations.** Iblher, P.; Mettler-Meibom, B.; Wichmann, B. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 154p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84751244.

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The study confronts the demand of German private households for energy advice with the existing supply. It is based on questionings of tenant and owner households, flat administrations and different kinds of consultants. These concerned participants, reasons, contents, procedure, costs and success of advising. The mutual critique of households searching and consultants offering help hints to necessary improvements. Foremost are better adapta-

tion to different target groups, institutionalized and more transparent successions of orientation from general to special information, an agency for coordination and education of consultants and a more efficient cooperation of different experts.

31052 **(BMFT-FB-T—83-308) About the behaviour of thermal insulating systems under heavy weathering conditions.** Manns, W.; Wisotzky, T. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 40p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84751246.

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Thermal insulating rendering systems are composed of a lower rendering with polystyrene particles and mineral binders as well as a mineral upper rendering. The system has to be permeable to water vapor and the upper rendering has to be impermeable to rain fall. Normally the upper rendering has a greater compressive strength than the lower rendering. In order to examine the long term behaviour quick motion weathering tests - radiation tests up to 70° and frost-thaw-alternating tests up to -12° - were carried out upon walls of 2,5 m x 2,5 m covered with three thermal insulating systems. After 75 or 50 cycles no removing of the rendering was stated. Owing to the high shrinkage values of the insulating rendering cracks appeared in the rendering of the test walls exposed to the extremely dry climate in the hall. This can hardly be stated on executed buildings owing to the fact that the annual average value of humidity of the air is very high in Central Europe. While testing the adhesive strength after exposing to the influence of temperature the fracture always appeared in the thermal insulating rendering. The ball test gave an impression diamter up to 44 mm and an impression depth up to 6 mm. The compressive strength should not exceed 0,8 N/mm^2.

31053 **(BNL—51732) Case study of the Blouin superinsulated house.** Hagan, D.A.; Jones, R.F. (Brookhaven National Lab., Upton, NY (USA)). Sep 1983. Contract AC02-76CH00016. 126p. NTIS, PC A07/MF A01; GPO Dep. Order Number DE84012886.

An evaluation is made of a superinsulated house designed by Scott Blouin and constructed in 1981 in South Royalton, Vermont. The house is distinguished by a combination of energy conservation features, including extensive thermal insulation, air infiltration control, and south orientation for solar heating benefit. The experiment results demonstrate that the energy needed for space heating is smaller than that for any house yet examined by Brookhaven National Laboratory. Alternative operating modes and designs are identified which could improve the house thermal and economic performance. It is concluded that the building thermal envelope performs nearly as calculated, and that most of the features employed are economically competitive with many common low-risk investments. A brief review of the development of super-insulated building technology and of marketplace issues is included.

31054 **(CONF-840518—1) Comparative economic evaluation of advanced building equipment technologies in the United States.** Minturn, R.E.; Nephew, E.A. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012357.

From IEA conference on heat pumps - current situation and future prospects; Graz, Austria (22 May 1984).

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Evaluations are made to allow the selection of those projects for further development that are most likely to make best use of R and D funds. In these analyses, the seasonal and annual performance of the advanced system are simulated, based on target steady-state efficiencies for the project. Then the energy savings an advanced unit would achieve over one or two reference systems in eleven representative cities in the United States are calculated. From this and some empirical choices of market penetration, the annual energy savings the new technology might bring about are estimated. By doing a similar and consistent analysis of a number of advanced technologies, R and D projects are ranked in value to the country. The results of the analysis of a number of advanced technologies are summarized, including heat-actuated space conditioning systems such as absorption heat pumps and Stirling-driven and internal combustion engine-driven heat pumps and advanced electric-driven systems such as continuously-modulated and step-modulated air-air heat pumps and ground-coupled heat pumps. Areas in which improvements must be made in order for certain advanced systems to become economically viable are noted.

31055 **(DOE/CE—0086) Residential Conservation Service Evaluation Report.** (USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC. Building Services Div.). Jan 1984. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011778.

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The purpose of this evaluation is to assess the effectiveness of the Residential Conservation Service (RCS) Program in encouraging the installation of energy conservation measures in existing homes. The following are included: RCS requirements and context, RCS status, RCS program effectiveness, utility perspective, and other perspectives. (MHR)

31056 **(DOE/CS/40117—T1) Diesel engine total energy system development in residential/commercial applications by 2000.** (Resource Planning Associates, Inc., Washington, DC (USA)). 16 Nov 1979. Contract AT03-76CS40117. 90p. NTIS, PC A05/MF A01; GPO Dep. Order Number DE84012823.

A diesel engine total energy (DETE) system will provide residential/commercial buildings with on-site electrical, heating, and cooling requirements in a very efficient manner. The potential market for DETE systems is estimated by identifying technically suitable applications. The economic attractiveness of DETE systems is determined using coal-derived fuels, applying the financial criteria used by decision makers to assess the economic performance of competing systems. The market development, and resultant energy savings, of DETE systems are estimated. An analysis of the effects of actions aimed at enhancing the expected market for DETE systems is presented.

31057 **(DOE/CS/40117—T4) Stirling engine total energy system development in residential/commercial applications by 2000.** (Resource Planning Associates, Inc., Washington, DC (USA)). 26 Mar 1979. Contract AT03-76CS40117. 101p. NTIS, PC A06/MF A01; GPO Dep. Order Number DE84012776.

The market-development potential of 300-kilowatt (kW) SETE systems was studied as an illustration of the market existing for residential/commercial total energy systems using engines in the 100 to 1000 kW range. Assuming that as many as six systems could practically be installed and operated at the same site, the applications requiring 300 to 1800 kW of capacity were addressed. Two scenarios were developed as a basis for estimating market development and therefore energy savings: oil-fired SETE systems available starting in 1987, and oil-fired units available starting in 1987 and coal-fired units available starting in 1992.

31058 **(DOE/CS/60014—1) Zoning for earth sheltered buildings. A guide for Minnesota communities.** (Minnesota Dept. of Energy, Planning and Development, St. Paul (USA)). Aug 1983. Contract FG45-76CS60014. 33p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012817.

Background information on earth sheltered buildings and the zoning issues related to this construction techniques is provided. Ways to develop goals and policies on earth sheltering and integrate them into existing planning documents are outlined. Ways to eliminate prohibitions and barriers to earth-sheltered buildings from zoning language are explained. Subdivision and planned unit development (PUD) regulations designed to facilitate and encourage new developments of earth sheltered homes are considered. Model language on planning, zoning, and subdivisions and planned unit developments and a summary of the various recommendations made throughout the guidebook are included. (MHR)

31059 **(DOE/CS/69104—6) First things first.** (Michigan Dept. of Commerce, Lansing (USA)). 1984. Contract FG45-80CS69104. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012707.

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This publication is based on a series of studies comparing the effectiveness of various combinations of eight basic home energy conservation measures: ceiling or attic insulation, caulking and weatherstripping, storm windows and doors, rim-joist insulation, side-wall insulation, basement wall insulation, insulated wall siding (outside of house), and triple-glazed windows. Using the results of these studies. This publication can help you decide what additional investments in energy conservation you should take. Step by step calculations make it easy for you to decide your best strategy for reducing the cost of heating and cooling your home.

31060 **(DOE/R1/10849—1) Technical assistance to support U.S. Department of Energy to review applications received under the NECPA Title III Grants Program.** Jones, W.J.; Azad, B. (B and M Technological Services, Inc., Boston, MA (USA)). 15 Oct 1981. Contract AC41-81R110849. 74p. NTIS MF A01; 2; GPO Dep. Order Number DE84011595.

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This report gives a background on the Program, documents B & M's participation in the Program and makes recommendations for improving future review and evaluation processes. A background discussion is given on the purpose of NECPA Title III, followed by significance of energy conservation in the economy, its business potential, energy conservation in buildings, the buildings targeted by the NECPA Title III, i.e., schools, hospitals, local governments, and public care institutions, and a brief discussion of the grant awards process. A summary of the tasks that were performed, a classification in tabular form of the types of applications reviewed, and major problem areas encountered, and suggestions regarding possible improvements to the review process are given. Appendix A contains four lists of questions, two checklists, and a comment sheet used in the review process. Appendix B presents a list of working references which were consulted when needed during the review process. Appendix C lists the reviewed applications by number, type, number of buildings, state, and name of applicant institution. Appendix D provides examples of O and Ms and ECMs that were considered satisfactory by B and M.

31061 **(DOE/R7/01177—T1) Residential heat pump with public water main heat exchanger.** Bourne, R.C. (Landmark Construction Co., Lincoln, NE (USA); Davis Energy Group, CA (USA)). 1980. Contract FG47-80R701177. 29p. NTIS, PC A03; 3; GPO Dep. Order Number DE84010092.

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The project goal was to design and install a building climate control system using a water-to-air heat pump in conjunction with a water main heat exchanger used as the winter heat source, and summer heat sink, for the heat pump. The following technical work tasks were completed: (a) evaluation of building heating and cooling loads by hourly computer simulation; (b) detailed evaluation and design of alternate techniques for heat exchange with the water main; (c) evaluations and cost effectiveness studies of alternate HVAC and domestic water heating system configurations. A substantial effort was also required to secure local approval for installation of a heat exchanger on a city water main in Lincoln, Nebraska. The system was designed for installation on a new townhouse to be constructed by Landmark Construction Co. of Lincoln. However, the weak housing economy during the timeframe of the project caused repeated delays, and an extension necessary to allow project construction was denied by the Department of Energy. Although actual construction might have caused unforeseen problems, results of the design phase indicate overall project feasibility to be excellent, particularly where city water supply is from wells, whose relatively constant temperature water improves heat pump performance throughout the year.

31062 **(DOT-I—83-10) Transportation energy management: transit operator facilities. Volume I. Office Guide.** (Municipality of Metropolitan Seattle-METRO, WA (USA)). Sep 1982. 41p. NTIS, PC A02/MF A01. Order Number TI84901223.

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This handbook presents practical, step-by-step instructions for developing and implementing a six-part energy conservation program. The program consists of the following elements: (1) An energy conservtion team to provide organized staff support for the conservation program. (2) An energy profile to determine the facility's energy consumption patterns and to establish an energy data base. (3) A walk-through survey of the facility to evaluate existing energy systems and practices and to identify potential energy-saving measures. (4) Implementation of no-cost/low-cost operating and maintenance (O & M) actions for immediate energy savings from changes in building operations and maintenance procedures that involve no or only minimal costs. (5) Evaluation of energy conservation measures (ECMs) to determine the cost-effectiveness of retrofit projects involving changes in the heating, ventilating andj air conditioning (HVAC) systems; the roof, walls, doors and other parts of the building envelope; the lighting system and other major energy users. (6) Establishment of a permanent conservation program to make energy conservation an ongoing part of transit operations and to develop employees' energy awareness. The handbook is divided into two parts. The first part is an office reference guide. It provides a general introduction to energy conservation, an overview of conservation in transit facilities and step-by-step instructions for organizing an energy conservation team, implementing low-cost operation and maintenance (O & M) actions, assessing the cost-effectiveness of energy conservation measures (ECMs) and making conservation a permanent part of transit operations. The handbook also includes a glossary of energy terms and a bibliography that lists useful references.

31063 **(DOT-I—83-11) Transportation energy management: transit operator facilities. Volume II. Field guide.** Bryant, D.; Coles, D.; Dewey-Swyer, J. (Municipality of Metropolitan Seattle-METRO, WA (USA)). Sep 1982. 108p. NTIS, PC A06/MF A01. Order Number TI84901224.

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The Field Guide is the second part of the Energy Conservation Handbook. Together with the Office Guide, the Field Guide provides step-by-step instructions for developing an energy conservation program for transit facilities. Because this part of the handbook focuses on data collection and on-site surveys, it has been published separately. Also included in the Field Guide are technical reference materials and a case study as appendices. The Field Guide provides the instructions and necessary focus for collecting baseline data on a building's energy use, and includes a checklist for conducting an on-site evaluation of the building's energy systems.

31064 **(FSEC-CR—90-83) Residential conservation demonstration: domestic hot water. Final report.** Merrigan, T. (Florida Solar Energy Center, Cape Canaveral (USA). Research and Development Div.). Sep 1983. 148p. NTIS, PC A07/MF A01. Order Number DE84901372.

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Four types of domestic hot water (DHW) systems installed in 80 homes throughout Florida were monitored from July 1982 to June 1983 by the Florida Solar Energy Center (FSEC) under a demonstration program for the Florida Public Service Commission. DHW systems selected for the program are located in four major population areas of Florida: Jacksonville, Orlando/Brevard County, Broward/Palm Beach Counties, and the Tampa Bay region. Twenty systems of each DHW type - conventional electric water heaters, heat pump water heaters, solar hot water systems, and waste heat recovery units - are metered to determine electricity use and hot water energy production. A microprocessor-based load profile recorder collects 15-minute interval data at each site and transfers it to an FSEC microcomputer over the telephone network twice a week. Analysis of a year's worth of data indicates that solar water heating systems operated with the highest average system efficiency and had the lowest average daily electrical load profile. Solar systems and waste heat recovery units had the least electrical demand on the Florida utility system summer peak day while solar and heat pump water heaters demonstrated the ability to shift or reduce the winter peak. Heat pump water heaters also demonstrated the best annual load factor but indicated problems with system reliability.

31065 **(LBL—16369) Multiple regression techniques applied to fenestration effects on commercial building energy performance.** Sullivan, R.; Nozaki, S. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 13p. (CONF-840124—7). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012260.

From American Society of Heating, Refrigerating and Air-Conditioning Engineers meeting; Atlanta, GA, USA (29 Jan 1984).

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Multiple regression statistical methods are used in the analysis of fenestration effects on space conditioning requirements of commercial buildings. The procedure permits the quantification of changes in energy usage due to certain factors that influence the selection of fenestration, namely, the basic window properties of size, conductance, and shading coefficient. In addition, the usefulness of daylighting and overhangs was examined. A representative range of climatic zones, orientations, and installed lighting power, in addition to the primary parametric on glazing properties (area, U-value, shading coefficient), were considered during the course of the study. The DOE-2.1B energy-analysis simulation program was used to define the thermal response of a prototypical building module, which was used to create a data base for the regression analysis.

31066 **(LBL—17330) How fenestration can significantly affect energy use in commercial buildings.** Johnson, R.; Selkowitz, S.; Sullivan, R. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 17p. (CONF-840320—1; EEB-W—84-01). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84009628.

From Cogeneration and energy conservation seminar; San Francisco, CA, USA (5 Mar 1984).

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This paper reports conclusions of an extensive series of computer analyses of annual energy use and electrical peak demand in two climates as functions of fenestration parameters. Particular attention is paid to daylighting and its associated energy tradeoffs. The study includes the effects of climate, orientation, glazing area, U-value, shading coefficient, visible transmittance, lighting power density, and lighting control strategy. The extensive set of parametric analyses generated in this study suggest that for a simple office module, fenestration can provide annual net energy savings in all climates if daylighting is used. Control of solar gain is critical to realization of energy benefits from daylighting. Fenestration and daylighting design strategies that reduce net annual energy consumption can also reduce peak electrical demand. The optimum combination of fenestration variables is a function of climate, orientation, and electric lighting power density.

31067 **(LBL—17501) Improving the energy performance of residential clothes dryers.** Hekmat, D.; Fisk, W.J. (Lawrence Berkeley Lab., CA (USA)). Feb 1984. Contract AC03-76SF00098. 13p. (CONF-8405181—1; EEB-Vent—84-4). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012574.

From 35. annual international appliance technical conference; Columbus, OH, USA (15 May 1984).

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Experiments were conducted to evaluate four techniques to improve the energy efficiency of electrically-heated domestic clothes dryers. Reduced air flow rate and heater input led to energy savings around 8%, while recirculation of a portion of the exhaust air back into the clothes dryer reduced energy consumption by approximately 18%. These two measures are attractive because of their low cost. Two modes of using an air-to-air heat exchanger for heat recovery were considered. The first is to preheat the inlet air with heat from the exhaust air, which resulted in 20 to 26% energy savings. The second mode is 100% recirculation of air through the dryer and a heat exchanger and condensation of water from this air in the heat exchanger by using indoor air as a heat sink. This resulted in 100% heat recovery (i.e., all heat was rejected to indoors) but the energy consumption of the dryer was increased by up to 6%. To maximize energy savings, a clothes dryer with a heat exchanger can be equipped to operate in the preheating mode in the summer and in the recirculation/condensation mode in the winter. The last measure investigated recirculation, through a heat pump (i.e., dehumidifier), also resulted in a 100% heat recovery and, in addition, up to a 33% reduction in dryer energy consumption, but this technique also yielded long drying times.

31068 **(VTT-TIED—254) Energy economical improvement of an oil heating system. Laboratory experiments.** Korhonen, R.; Tormonen, K. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Dec 1983. 36p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751469.

Research has been done in laboratory conditions concerning the effect of various improvements like adding insulation to the boiler, changing the burner etc. on the performance level of old boilers. The boilers that were chosen for the purpose have been in normal domestic use during several years. The boilers were brought to the laboratory in the same condition as they had been in the field. The performance level of a boiler has been evaluated by measuring its annual efficiency. First in the condition as it was when coming to the laboratory and then every improvement. Further more some supplementary measurements have been made. The results show that adding insulation to the boiler is a profitable procedure. Ready-to-operate losses of the insulated boilers have been about 0.3 kW. Changing the burner has had energy economical significance only when the burning efficiency of the old burner has been below 90 per cent.

31069 **(VTT-TUTK—215) Airtightness of the building envelope.** Polvinen, M.; Kauppi, A.; Saarimaa, J.; Haalahti, P.; Laurikainen, M. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Sep 1983. 147p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751461.

Air leakages through the external envelope lead to many inconveniences. Higher consumption of energy, drayght, moisture defects, and reduction of thermal insulation are the results of air infiltration. The study aimed at better knowledge of the airtightness of the building envelope. The first step was to measure the airtightness of buildings by the so called pressure method as well as a literature study of corresponding measurements in the Scandinavian countries. The air leakage points were located by thermography in connection with pressure tests. The report consists of a list of actual definitions. A short description of the methods for field measurement of air tightness is given as well as the need for air tightness requirements in Finland and the situation in the other Scandinavian countries. The air tightness of buildings was mainly measured in timber framed detached houses and in some detached houses made of masonry or concrete as well as houses of flats.The struggle for good air tightness implies that ventilation, heating and air infiltration are considered as a whole. The improvement of airtightness must not lead to poorer climate. We should be aware of these matters when setting up performance requirements for airtightness. The next part of the report deals with materials which are used for airtightening of constructions. The most common materials are included in the report. The most critical details in airtightening of constructions are discussed and some alternatives for useful solutions are described. Finally, the costs and savings of airtightening are discussed.

31070 **(VTT-TUTK—234) Proposal for airlightness requirements.** Railio, J.; Saarnio, P. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Nov 1983. 95p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751471.

The share of ventilation in the energy demand in Finnish building stock is about 50 per cent. An essential part of the ventilation heat losses is uncontrolled due to air infiltration, which only partly serves the demand of ventilation. The aim of improving the airtightness of windows and other leak points is to prevent the infiltration. But then, if the supply air intake is not mechanical, certain risks of insufficient ventilation occur. In the report, the interconnection between the building envelope and ventilation system is studied. As a result of the study, a preliminary suggestion for airtightness requirements is presented, both for new and existing buildings. In developing the suggestion, the performance and costs of the constructions and ventilation systems, to achieve good airtightness and sufficient controlled ventilation, are taken into account. If

requirements for airtightness are given, also methods for measuring the airtightness and air change rates are necessary. The measurement methodics for different types of buildings, also existing, is pre sented. Detailed instructions for measuring are, however, written in a separate report. The need and costs of controlling the workmanship are briefly described. Finally, the whole Air Infiltration Research is summarized.

31071 **(WAOENG—83-44) Bright ideas. An energy conservation guide for small businesses.** Machold, W.D.; Wilkinson, R.D. (Washington State Energy Office, Olympia (USA)). Dec 1983. 41p. Washington State Energy Office, 400 East Union, Olympia, WA 98504. Order Number TI84901173.

The data needed to develop an energy management plan for your business are described. Conservation tips suitable for all businesses are suggested and additional information for specific businesses is provided. How to calculate the economic feasibility of making energy improvements and how to create an action plan are described. More ambitious district wide energy management approaches are discussed. (MHR)

31072 **The National Program for Building Thermal Envelope Systems and Insulating Materials (BTESIM).** Lundy, T.S.; Freeman, E.C. (Oak Ridge National Laboratory Oak Ridge, TN). pp 3.116-3.122 of Energy conservation in the built environment. Minogue, P. Dublin, Ireland; An Foras Forbartha (1982). (CONF-8210216—). Contract W-7405-ENG-26.

From 3. international symposium on energy conservation in the built environment; Dublin, Ireland (1 Oct 1982).

The subject paper embraces the cooperative efforts of the public and private sectors to generate technical information needed for improvements in the energy efficiencies of the envelopes of buildings within the United States. Emphasis is placed on the appropriate use of various insulating materials within floor, wall, ceiling/attic/roof systems to control heat flow and to optimize envelope design and construction practices. Expertise from throughout the building community is brought to bear on specific building envelope problem areas with government primarily involved in long-term research in the building sciences and with the private sector emphasizing shorter term technical R & D including proprietary product development. Management of much of the U.S. Department of Energy lead role in the BTESIM Program is delegated to the Oak Ridge National Laboratory which has major thrusts in materials, systems, diagnostics, innovative concepts, and education. DOE research activities are performed throughout the United States at government labs, universities, and within private organizations through suitable financial arrangements. Overall programmatic objectives will be indicated with specific examples of research output given in summary form.

3202 Transportation

REFER ALSO TO CITATION(S) 31062, 31063

31073 **(DOT-I—82-20) Transportation energy contingency planning: transit fuel supplies under decontrol.** (Cabot Consulting Group, Washington, DC (USA)). May 1982. 41p. NTIS, PC A03/MF A01. Order Number TI84901213.

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In order to assist transit operators in competing effectively in the marketplace for fuel supplies, the Urban Mass Transportation Administration (UMTA) is undertaking a number of projects designed to develop technical assistance materials on contingency planning. This report, is designed to give transit operators a better understanding of the diesel fuel market under decontrol and the implications of this new environment for contingency planning. It presents a number of fuel supply strategies which transit operators may wish to consider as a part of their contingency plans. Given the importance fuel plays in day-to-day operations and in operator budgets, it is believed a number of the strategies also have validity in non-emergency circumstances as well.

31074 **(DOT-I—82-37) Transportation during the next energy crisis: the special problems of small urban areas. Final report.** Crowell, W.; Shapiro, A.; McShane, W. (Polytechnic Inst. of New York, Brooklyn (USA). Transportation Training and Research Center). Jun 1981. 83p. NTIS, PC A05/MF A01. Order Number DE84901218.

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The purpose of this study was to provide local government officials and other interested parties in small urban areas (less than 50,000 pop.) with special assistance in the planning and implementation of transportation energy contingency plans. The nature of such contingencies and their impact on the transportation sector are reviewed, along with the special transportation characteristics of small urban areas (modal split, trip purpose distribution, transit structure, etc.). After establishing the nature of Federal and State contingency responsibilities, the basic local contingency plan needs are assessed, and a wide array of potential strategies are analyzed according to a consistent set of criteria (financing, timeframe, institutional problems, targeted mobility needs, special strategy-specific problems). The final chapter reviews the results of these assessments and makes a number of conclusions and recommendations. A special 13-page guidebook on contingency planning, following a question- and answer format, was also developed and is included in the appendix.

31075 **(DOT-I—82-38) Transportation energy contingency planning: taxi and school bus use in Dallas-Fort Worth.** Barker, W.G. (Barker (William G.) and Associates, Arlington, TX (USA)). Aug 1982. 167p. NTIS, PC A08. Order Number TI84901212.

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While the decontrol of petroleum and ending of allocation controls and the possibility of state and local set asides has eliminated a variety of possible fuel supply oriented actions for states and local governments, a wide range of service and operational improvements remain. Among these are use of taxicabs and school buses for paratransit services. This report synthesizes the experience of the Dallas-Fort Worth area in planning for the use of such vehicles in energy emergencies. It may provide an important insight into the process an area would undertake to address development of such services. The report also highlights a number of important institutional issues likely to arise when taxicabs and school buses are considered for use in such circumstances. The report clearly demonstrates the need for contingency planning in advance of an emergency if these institutional barriers are to be successfully addressed.

31076 **(DOT-I—83-01) Transportation energy management: current transit operator activities.** (Municipality of Metropolitan Seattle-METRO, WA (USA)). Sep 1982. 38p. NTIS, PC A03/MF A01. Order Number TI84901225.

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This report describes the results of a national survey of energy management activities undertaken by 100 transit systems in the United States andd Canada. Participants in the survey reported on activities in five areas: energy crisis contingency planning; energy conservation in bus maintenance, repair and operating facilities; energy conservation for petroleum-fueled bus fleets; energy conservation awareness programs; and fuel supply and price protection strategies. The response rate to the survey of 36.4 percent, and the individual responses themselves indicate considerable interest in energy conservation and related issues.

31077 **(DOT-I—83-09) Transportation energy contingency planning: financing emergency transit services with temporary fare surcharges.** Felice,C.; Larson, A. (Municipality of Metropolitan Seattle-METRO, WA (USA)). Dec 1982. 42p. NTIS, PC A03/MF A01. Order Number DE84901221.

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The feasibility of using a temporary fare surcharge as a source of additional operating revenue for transit agencies during an energy crisis is examined. The characteristics of a temporary surcharge proposal, including the general advantages and disadvantages of the surcharge, are discussed. Using data from the Municipality of Metropolitan Seattle, two representative scenarios were developed on the assumption that Seattle Metro would consider im-

posing a temporary surcharge during an energy crisis. The first scenario assumes Seattle Metro would impose a surcharge to cover the increased costs of operating its base service. The second one assumes a more severe energy crisis which would encourage Seattle Metro to provide peak overload service. Under this scenario, Seattle Metro would impose a surcharge to cover the increased costs of operating its base service and the total overload service operating costs. Background information on Seattle Metro, including their experience with previous energy crisis is presented. The scenario details and conclusions are followed by a discussion of the limitations of a temporary fare surcharge.

31078 **(DOT-I—83-26) Estimating transportation energy consumption of residential land types. Final report.** (Dane County Regional Planning Commission, Madison, WI (USA)). Feb 1983. Contract AI01-81CS90103. 118p. NTIS, PC A06/MF A01. Order Number TI84013589.

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To estimate the transportation energy implications of residential development, the vehicle miles traveled (VMT) from that development was calculated for each individual unit of government in Dane County. The VMT incorporates the trip frequency and the associated trip length for vehicular trips made by occupants of single and multi-family dwelling units for any given location in the county. The methodology involved ten basic steps which included: defining the overall study area, defining subareas, determining the average number of household trips by dwelling unit type in each subarea, determining the average trip length for each household type, calculating the resulting VMT, applying the VMT factors to the existing fleet of vehicles and the estimated miles per gallon (MPG) rating, estimating the gallons of fuel consumed, converting gallons to Btu's, determining density and transportation energy relationships, and developing a system for tracking transportation energy consumption trends from residential development. The results available include trip frequency rates, average trip length, annual vehicle miles traveled, the resulting gallons of fuel consumed and costs of that fuel. These factors are provided for single-family and multi-family units. The data are presented in two different categories: community class and geographic area.

31079 **(DOT-I—83-39) Transportation energy management: fuel futures.** (Cabot Consulting Group, Washington, DC (USA)). Feb 1983. 71p. NTIS, PC A04/MF A01. Order Number TI84901222.

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The purpose of this study is to assess the feasibility of mass transit operators trading in the fuel oil futures market as a means to reduce price risk associated with buying and storing fuel, and as a means to enhance fuel-supply security. Trading in the fuel oil futures market is one option that has been identified as being of potential benefit to mass transit operators in their effort to minimize fuel costs both in normal and energy crisis situations, and as a means to insure fuel availability during petroleum supply interruptions. This study was undertaken to advise and inform mass transit operators on the commodity futures market so that operators will be in a position to make a valid judgement on the merits of trading fuel oil futures for their own transit systems. This report will describe and explain how the futures market operates. It will identify and describe the potential costs and benefits, and present the specific questions that need to be answered before the feasibility of futures trading by any particular transit system can be determined. The study will reach some broad conclusions as to the feasibility of transit systems trading fuel oil futures.

31080 **(DOT-P—30-81-06) Federal, state and local responses to 1979 fuel shortages.** Schueftan, O.; Ellis, R.H. (Peat, Marwick, Mitchell and Co., Washington, DC (USA)). Feb 1981. 103p. GPO. Order Number TI84901219.

There are many lessons that can be learned from examining federal, state and local responses to the 1979 fuel shortages which can be applied to present and future energy contingency planning efforts to enhance their effectiveness. Case studies were made of emergency transportation energy conservation actions implemented, or attempted, in Los Angeles, Dallas-Fort Worth, Minneapolis-St. Paul, Seattle, Rhode Island, and New York State. Information on responses to the fuel shortages for each case study area was obtained through on-site meetings with representatives of organizations having a strong interest in emergency transportation actions such as transit operators, metropolitan planning organizations, service station dealers, state highway and energy departments, ridesharing agencies, and others. Types of emergency transportation actions most commonly implemented or attempted by the case study areas were: (1) expanded public information and marketing distribution systems; (2) emergency expansion of ridesharing (carpool and vanpool services); (3) rehabilitation and placing in service of standby reserve or mothball fleet buses; (4) implementation of odd-even and/or minimum (maximum) fuel purchase restrictions; and (5) monitoring of transit ridership and shifting buses to the most heavily used routes. These case studies discuss, and partially assess, the major transportation energy contingency actions implemented, key implementation problems encountered, and actions planned but not implemented. Preliminary conclusions, recommendations, and implications for developing future transportation energy contingency plans are presented in a separate volume.

31081 **(VTT-TUTK—236) Forecast of person car fuel consumption.** Kallberg, H. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Nov 1983. 68p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751472.

The aim of this study is to predict the energy consumption of the person car park in Finland, depending on the economical development in the country. This is accomplished by calculations according to 4 different economical scenarios. The calculations include the predictions of car park, car mileages and fuel consumption. Statistics show that the average car fuel consumption per mileage seems to be decreasing distinctly. The new car makes and technical demenstration of the car industry have a tendency of decreasing fuel consumption. Even though the increasing car size due to safety and comfort aims is predicted, the decreasing trend in fuel consumption will continue. The quantitative trend estimate of the degree of this tendency is dependent for instance on the distribution of the Finnish car import. In this study it is assumed that the average fuel consumption shall decrease 2%/a until 1990 and 1%/a afterwards. The predictions of the total car mileage and the car fuel consumption characteristics are leading to the conclusions that with a modest economical development (GNP grows 3%/a) the total fuel consumption of the person car park does not grow considerably and due to the increasing share of diesel engines the gasoline consumption begins to decrease. In all scenarios the probable growth in the total car fuel consumption remains distinctly lower than the corresponding growth in the car park or in the GNP. The share of the diesel engined cars is studied separtely. It can be affected by state measures like fuel taxes. When the differences in the fuel consumption between diesel and gasoline engines are dimishing with technical development, the car markets are becoming more sensitive to these measures. A long term policy for developing the diesel car park would be needed.

3203 Industry And Agriculture

REFER ALSO TO CITATION(S) 30167, 30173, 30477, 30487, 30510, 31071, 31109

31082 **(BMFT-FB-T—83-281) Investigation of sources of selected substances and their remaining in sewage sludge.** Arendt, G.; Eggersdorfer, R.; Faltin, M.; Frische, R.; Haag, F.; Lichtwer, L.; Rippen, G.; Steinsiek, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 136p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE84751243.

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The study was aimed at developing and applying a method which permits identification of that group of substances present in the technosphere which may jeopardise the use of sewage sludges for agricultural purpose. A multi-stage evaluation procedure was developed, using methods from various sciences. Its main elements were: 1. Characterisation of the substances; 2. Investigation of the technosphere; 3. Collection of analysitiral chemical data; 4. Theoretical considerations and, derived from 1. to 4., evaluation of the substances. The investigation proved that the selected set of parameters (application, concentration of hazardous substances in the

sewage, capability of being accumulated or eliminated) are suitable for identifying those substances which may possibly be contained in the communal sewage sludge for agricultural applications in elevated concentrations and thus represent a potential health hazard.

31083 **(CONF-8309212—) Hard coatings for tribological systems operating under extreme conditions.** (USDOE Assistant Secretary for Conservation and Renewable Energy, Washington, DC. Office of Energy Systems Research; Argonne National Lab., IL (USA)). Mar 1984. Contract W-31-109-ENG-38. 183p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84009660.

From Workshop on hard coatings for tribological operation under extreme conditions; Argonne, IL, USA (8 Sep 1983).

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Separate abstracts were prepared for individual papers. (MHR)

31084 **(DOE/CS/15073—T2) Use of solid waste material as a raw material in a cement process.** Midlam, E.W. (Midlam (Edward W.), Lake Charles, LA (USA)). 10 May 1984. Contract FG01-81CS15073. 26p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011784.

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Tests were done to show that spent clay can be safely used as a raw material for a cement plant. Thirty lube oil refiners who should have deposits of spent clay were surveyed for feasibility of use in cement plants. (MHR)

31085 **(DOE/CS/40289—T1) Environmental and energy benefits of microprocessor control of oven airflows from metal painting operations.** (Chemical Coaters Association, Wheaton, IL (USA); Centec Corp., Reston, VA (USA); Mack Trucks, Inc., Allentown, PA (USA)). 12 Dec 1983. Contract AI01-79CS40289. 307p. NTIS, PC A14/MF A01; 1; GPO Dep. Order Number DE84012459.

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The use of microprocessor technology to enhance control of volatile organic compound emissions from paint curing ovens is evaluated and the energy requirements and operating cost of the curing process are simultaneously reduced. The curing operation, the project approach, and the basic theoretical background of the concepts are described. A detailed discussion of the system design and the prototype test results are included. The major benefits of the microcomputer control system and the major design criteria to be addressed are highlighted. (MHR)

31086 **(DOE/CS/40397—T1) Energy conservation in meat, poultry, and dairy processing. Final report: development of a proposed conference series.** (Systems and Applied Sciences Corp., Riverdale, MD (USA)). 31 Jul 1981. Contract AC01-80CS40397. 263p. NTIS, PC A12; 3; GPO Dep. Order Number DE84007870.

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A seminar series is proposed to target seven technologies for promotion to the meat, poultry, and dairy industries. Hog skinning, continuous rendering, whole blood processing, and electrical stimulation/hot deboning were selected as the most promotable technologies within the Meat Processing Industry. In Dairy Processing, multistage drying and mechanical vapor recompression are the targeted technologies. Waste heat recovery is a generic technology. The logistics of the seminar series is presented. The activities of the meat, poultry and dairy industries in energy conservation are reported. (MHR)

31087 **(EGG-M—04584) Emerging technology from the DOE industrial heat pump program.** Plaster, D.S.; Chappell, R.N. (EG and G Idaho, Inc., Idaho Falls (USA); Department of Energy, Idaho Falls, ID (USA). Idaho Operations Office). 1984. Contract AC07-76ID01570. 13p. (CONF-840302—5). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012616.

From 11. annual energy technology conference and exposition; Washington, DC, USA (19 Mar 1984).

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In 1976 a program was established to develop industrial heat pumps that could recover waste energy from and return it to the same process. Three research and development projects support that objective: A waste-heat-powered, steam-compression system was developed. This system, powered by a waste-heat-driven turbine, extracts 34.7 million Btu/h from dirty steam at 25 psia to produce 20.9 million Btu of clean steam per hour at 40 psia. A high-temperature Rankine system was developed with methanol as the working fluid. This system, powered by a 2500-hp electric motor, extracts 24.3 million Btu/h from dirty steam at 25 psia to produce 30 million Btu of clean steam per hour at 78 psia. A Brayton cycle solvent-recovery system was developed. This system recovers solvents from airstreams in drying ovens, restores the heat of vaporization to the airstream, and returns the solvent-free air to the drying ovens. The manufacturers began testing prototypes of all three systems in 1983. Testing of the MTI prototype is complete; the other two prototypes are presently in testing. The systems will be ready for installation at other industrial sites during 1984.

31088 **(EGG-M—10084) Energy use reduction potential in the beet sugar industry.** Barron, T.S.; Heist, J.A. (Heist Engineering Corp., Walnut Creek, CA (USA); Heist Engineering Corp., Wilmington, NC (USA)). 1984. Contract AC07-76ID01570. 9p. (CONF-840434—2). NTIS, PC A02; 3; GPO Dep. Order Number DE84012525.

From 6. annual industrial energy conservation technology conference; Houston, TX, USA (15 Apr 1984).

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Process energy use data are presented for most of the forty operating beet sugar factories in the United States. Sixty percent of the processing capacity is in states that actively pursue cogeneration projects. Most of the present factories cogenerate steam and electricity for their own use. Fossil fuel boilers and low- to medium-pressure steam turbines are used exclusively for this purpose. Three alternative cogeneration technologies are evaluated, with economic feasibility found to depend on the price at which excess electricity can be sold.

31089 **(EGG-M—15583) Energy conservation in fertilizer production.** Mings, W.J.; Sonnett, W.M. (EG and G Idaho, Inc., Idaho Falls (USA); Department of Energy, Washington, DC (USA). Office of Industrial Programs). 1984. Contract AC07-76ID01570. 6p. (CONF-840434—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012535.

From 6. annual industrial energy conservation technology conference; Houston, TX, USA (15 Apr 1984).

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An energy efficient fertilizer production device called the Pipe Cross Reactor (PCR) was developed by the National Fertilizer Development Center (NFDC) of the Tennessee Valley Authority (TVA). The PCR uses the heat of reaction of ammonia with phosphoric acid and sulfuric acid to replace fossil fuel heat used in granulating and drying fertilizer. The device has been installed in about 30 fertilizer plants across the U.S.A. resulting in current annual energy savings equivalent to approximately 11 million gallons of fuel oil. In six years of cooperation with the TVA, the DOE spent about one million dollars on the PCR technology transfer effort. This TVA project is a notable success based upon demonstrated energy savings and industry acceptance of the technology. The technology is applicable to producing NPKS, DAP and MAP types of fertilizer. This paper discusses the technology with emphasis on the technology transfer work conducted by TVA and supported by DOE-OIP.

31090 **(GA-A—17334) Spiral fluted tubing for augmented heat transfer in process industries. Final report.** Yampolsky, J.S.; Pavlics, P. (GA Technologies, Inc., San Diego, CA (USA)). Apr 1984. Contract AC07-81ID12295. 86p. NTIS, PC A05; 3; GPO Dep. Order Number DE84009098.

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Single tube tests were performed on spiral fluted tubing, condensing on the shellside and boiling on the tubeside. These tests were done in a single tube test facility constructed at GA Technol-

ogies to evaluate the heat transfer enhancement that could be achieved with this tubing. Substantial enhancement was achieved in addition to the area extension. The test results indicate a factor of 2.4 to 3.2 for boiling and a factor of 2.8 to 5.6 for condensing for the combined effect of enhancement and area extension. A number of heat exchanger design studies were made to compare this tubing with plain tubing. A cost comparison of the heat exchangers required in a low temperature power recovery application was made to show the advantage of this tubing.

31091 **(LBL—17394) Experimental studies of enhanced emittance by Zeeman splitting of a low-pressure mercury/argon discharge.** Hollister, D.; Berman, S.M. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 9p. (CONF-8304176—2; EEB-L—83-09). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012572.

From 3. international symposium on the science and technology of light sources; Toulouse, France (18 Apr 1983).

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The Zeeman-effect experiment is designed to quantify the amount of mercury resonance radiation production at λ2537 at elevated (i.e., >42°C) cold-spot temperatures in a mercury discharge tube in the presence of an external magnetic field. A 24% enhancement is observed at a field value of approximately 700 gauss where the Zeeman splitting is comparable to the Doppler width. The value of the magnetic field of the maximum is in agreement with the Richardson-Berman theory.

31092 **(NP—4770320) New thermal waste heat purification system: operating criteria and the four main constructional features.** Klein, T. (Duerr Anlagenbau G.m.b.H., Stuttgart (Germany, F.R.)). 1982. 20p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770320.

A waste air purification system is described. Of the operational criteria, CO and NOsub(x) concentrations in the purified gas, waste air preheating, combustion air supply and heat recovery are mentioned. Constructional features are described.

31093 **(PNL—5008) State of technology of direct contact heat exchanging.** Vallario, R.W.; DeBellis, D.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1984. Contract AC06-76RL01830. 72p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84012824.

Specific objectives of this study were to assess the state of technology development and to identify and evaluate the constraints to wider use of direct contact heat exchanger (DCHE) technology in the U.S. The scope of this study is relatively broad; it includes many types of generic systems and end-use applications, both current and future. Domestic and foreign experience with DCHE technology are compared, although the primary focus is on domestic experience. Twenty-two distinct applications of DCHE technology were identified in this study and are examined in this report. The general format is to describe each system, explore its potential applications, discuss current and past research activities and identify major implementation barriers. Finally, as a result of discussions with principal users of DCHE systems and with other knowledgeable sources, generic and specific R and D needs to overcome specific implementation barriers have been identified. The following list of DCHE systems/concepts has been classified into four major end-uses; there is also a category for specialized (other) applications.

31094 **(VTT-TIED—250) Risk analysis of a black liquor recovery boiler plant.** Reunanen, M.; Suokas, J.; Salo, H. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Sep 1983. 68p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751470.

Some operational errors and structural failures may cause black liquor recovery boiler explosion leading in addition to considerable material damages and also to personal injuries. The risk analysis of the plants was started with a risk charting applying the brain storming technique. As a result 152 hazards were found. The pipe lines, vessels and process equipment of the black liquor recovery boiler plant were then examined in detail using operability study. Over 200 hazards were thus recognized and their causes were studied. For instance, in the liquor system over 60 cases were recognized in which inadvertent dilution may appear. The accident risks were sought using work safety analysis. Three important professions were studied - boiler keeper, stoker and evaporation plant keeper. Altogether 80 hazards were found. The most important problems were connected to the accessibility of appliances and the walkways used and their defects. Problems and hazards connected to maintenance were sought by using the MORT-method and action error analysis. A total of over 260 different improvements were proposed as a result of the risk analysis. About one third were found during the operability study, one third during the maintenance study and the rest during the risk charting and work safety analysis. Over one half of the proposals were technical in nature. Of the methods used in risk analysis the operability study proved the most important for the improvement of operational safety. It gave an overview of the hazards and their causes. The other methods - work safety analysis, MORT and action error analysis - complemented the operability study by focusing on limited special fields - the safety of single tasks and maintenance.

31095 **(VTT-TUTK—162) Energy reserch in the mechanical forest industry 1980-1982. Energy consumption in the manufacture of joinery products, wooden houses and in the further processing of sawn timber.** Tarvainen, V.; Froeblom, J. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Mar 1983. 90p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751462.

Energy consumption in the mechanical forest industry in 1979 was studied by sending questionnairies to all the significant factories Information was requested on power and heat consumption and installed power in separate process phases. For background information, some aspects of the production process were also requested. The factories which answered the inquiry produced about one half of the doors and windows manufactured in 1979, one sixth of the finger jointed timber and about one third of other products in the branch. The total energy consumption in the branch was 1 556 TJ, 77% was heat. The share of the joinery industry (doors, windows and fixtures) in the total was 2/3, of which 86% was heat energy. The energy needed in the wooden house industry was 219 TJ, in planing works 137 TJ, in the gluelam industry 86 TJ, in finger jointing 76 TJ and in the production of roof trusses about 6 TJ. The investigated brances accounted for 7% of the energy consumption of the whole mechanical forest industry. The energy consumption in producing products of the same type in different factories varied very much. The differences were partially structural. However, there is considerable room for energy savings in many of the factories.

31096 **(VTT-TUTK—163) Energy research in the mechanical forest industry 1980-1982. The improvment of the energy economy of particle drying.** Salin, J.-G.; Koskela, K. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Mar 1983. 130p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751460.

The possibility of saving energy in particle drying by adjusting the drying conditions was investigated both theoretically and by practical tests. The theoretical part of the research included the development of a simulation model for particle drying and an investigation made with the aid of this model about the possibilities of saving energy. By comparing the results obtained from the simulation to the results from practical tests a conclusion could be made that particle drying can be simulated theoretically with sufficient accuracy. Theoretical studies and practical tests showed that there are various ways of saving energy in particle drying. The most important of them is raising the relative humidity of drying gas. Then the capacity of the dryer descends a little but it can generally be compensated for by raising the temperature. Especially in those cases when drying is not carried out with full capacity the liberated capacity should be exploited in order to save energy. The more homogenous the particle material to be dried is, the smaller is the energy consumption since the particles must be dried according to the moistest particles. Due to the measures for saving energy the average drying temperature rises slightly and the oxygen content of the drying gas falls clearly. It is obvious that the fire risk does not at any rate increase due to these actions for saving energy. The

profit of the actions for saving energy after the costs of their realization is probably abt. 10% of the energy costs. For the Finnish particle board industry an energy saving of 10% would mean saving over 4 million Fmk yearly counted on the basis of the oil price in 1982.

31097 **(VTT-TUTK—216) Energy research in the mechanical forest industry 1980-1982. Energy consumption in sawmill industry.** Usenius, A.; Tarvainen, V. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Sep 1983. 43p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751463.

Energy consumption in the manufacture of sawn tiber in 1979 was clarified by means of an inquiry. 52 sawmills answered the inquiry. Their summed up annual production was about 4.5 million cubic metres, that is 48% of the total production of sawn timber in Finland. On an average 2.23 m^3 of wood raw material (bark included) and 3.0 working hours were needed per one cubic metre of manufactured sawn timber. The values of installed power calculated per annual capacity (work in two shifts) varied from 17 W/m^3 to 39 W/m^3 when the average weighted by production was 25 W/m^3. Thus the total installed power in the Finnish sawmill industry can be estimated to about 240 000 kW. 1/4 of the total power was installed in the sawing process and 1/6 in the drying process. The consumption of electricity varied from 8 kWh/m^3 to 120 kWh/m^3 when the average weighted by production was 62 kWh/m^3. With reference to heat, the consumption varied from 0.63 GJ/m^3 to 1.92 GJ/m^3 when the average weighted by production was 1.92 GJ/m^3. 1/3 of electrical energy is consumed in the drying process and 1/4 in the sawing process. 3/4 of heat is needed for drying of sawn timber. The Finnish sawmill industry consumed 555 GWh of electrical energy and 10 480 TJ of heat energy in 1979. Thus the proportion of heat of the total energy consumption is 84%.

31098 **(VTT-TUTK—228) Gasification of indigenous fuels and the use of gas at commercial greenhouses.** Leppaelahti, J.; Jantunen, M. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Dec 1983. 43p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751464.

Possibilities of using gasification technique in the energy production of commercial gardens is discussed. The efficiency of a heating station where sod peat is first gasified to fuel gas with an updraft method and then burnt in a usual flue boiler was measured experimentally. The efficiency of gasification ranged between 84 and 92%. The product gas was burnt in a boiler with a nominal efficiency of 1.2 MW. The air coefficient of the combustion of moist tarry gas was 1.10-1.24 and the flue gas losses were 5-10%. The total efficiency measured indirectly was 80-84% in the output area studied when the area of output regulation was 1:4. The annual efficiency would be 81-82% on the basis of the test run. However, it is reduced by daily shutdowns and sudden output changes typical of commercial horticulture. The rising rate of gasifier output was measured after a 12 h daily shutdown. The output of the gasifier rose on average at the rate of 16 kW/min. The full capacity could be reached within about 75 min after starting the air blow. In practice, the shutdowns are shorter and the insulation of the gasifier better and hence the rising rate of output was considered sufficient with regard to commercial greenhouses. The economy of a gas-fired heating station was studied in output classes of 1.7 MW, 3.3 MW and 6.7 MW. The gasification heating stations were dimensioned as base load stations with 0.5 MW, 1 MW and 2 MW outputs. The price of heat was respectively about FIM 160/MWh, FIM 143/MWh and FIM 124/MWh. The profitability is not reached if the costs are compared with oil heating costs of greenhouses. If the values given in the publication KTM B:18 of the Finnish Ministry of Trade and Industry are taken as the investment and the technical efficiency values of oil heating, the profitability is reached in size classes of 3.3 MW and 6.7 MW.

31099 **Alternative financing of industrial waste recovery.** Merrill, M.S. (First Wisconsin National Bank, Milwaukee). pp 43-54 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

There is an extreme urgency to cultivate creative and effective financing mechanisms for the waste recovery industry. This paper focuses on specified financings deemed to fulfill those needs, as well as an appendix of general financing tools for future reference. The subject matter is divided into categories of private and public fund sources.

31100 **Chemical waste as fuel for cement kilns.** Freeman, H.M.; Lee, C.C. (California Office of Appropriate Tech., Sacramento; Environmental Protection Agency, Cincinnati, OH). pp 285-294 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Using hazardous wastes as supplemental fuel for cement kilns during the production of cement is discussed. Included are reviews of several test burns and a summary of a program being pursued by the State of California to encourage using waste fuels for cement kilns.

31101 **Utilization of apple press waste to replace fossil fuel to generate process steam.** Binkley, R.; LaCour, W. (Knouse Foods Coop., Inc., Peach Glen, PA; Commonwealth of Pennsylvania Dept. of Environmental Resources, Harrisburg, PA). pp 305-310 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A unique system that has been installed at one of the Knouse Foods apple processing plants to convert apple waste residues into boiler fuel is described.

31102 **Biological sludge from synthetic fiber manufacturing plants as a soil amendment.** Lane, C.L. (Clemson Univ., SC). pp 353-358 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A greenhouse pot study using loblolly pine was used to determine the effect of several levels of sludge from three synthetic fiber manufacturing plants on the physical and chemical properties of surface and subsoil of an Altavista soil in the upper coastal plain. The mixtures used were (solid sludge/soil): 0/100; 1/99; 5/95; 10/90; 100/0. Measurements made were: height growth; stem diameter groth; root/shoot ratio; survival; wilting point; field capacity; available water; Ca; Mg; K; Zn; Cu; Cr; NH_4; NO_3. Height and stem diameter growth was best in the 10/90 mixture, both in the surface and subsoil. Survival was 100 percent in all but the 100/0 treatment which was 60 percent. Water holding capacities and nutrients increased with increasing sludge mixtures.

3206 Municipalities And Community Systems

REFER ALSO TO CITATION(S) 30184, 30475, 30476, 30489, 30490, 30510, 30609, 30994, 31082, 31673

31103 **(ANL/CNSV-TM—130) Proceedings of the waste-to-energy workshop on small-scale combustion systems.** Brooks, C. (comp.). (Argonne National Lab., IL (USA)). Feb 1984. Contract W-31-109-ENG-38. 195p. (CONF-830717—). NTIS, PC A09/MF A01; GPO Dep. Order Number DE84009130.

From Small-scale combustion systems - a waste-to-energy workshop; Nashville, TN, USA (20 Jul 1983).

Separate abstracts were prepared for individual papers. (MHR)

31104 **(ANL/CNSV-TM—136) Power plant retrofit to district heating and cooling projects and grid-connected integrated community energy systems projects. Program summary meeting, 1983.** Kennedy, A.S.; Karvelas, D.E. (comps.). (Argonne National Lab., IL (USA)). Dec 1983. Contract W-31-109-ENG-38. 176p. (CONF-8305192—). NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84011796.

From Power plant retrofit to district heating and cooling projects and grid-connected integrated community energy systems projects meeting; Washington, DC, USA (24 May 1983).

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Community projects were selected in two areas: (1) power plant retrofit to district heating and cooling (DHC) and (2) grid-connected integrated community energy systems (GC-ICES). In the first area, existing power plants were to be retrofitted to recover rejected heat, and thermal piping networks were to be planned and constructed to distribute the heat to the local community. In the second area, smaller-scale projects were to be designed and developed to meet the requirements for thermal energy service within the local community and to sell cogenerated electricity to the electric power grid. These projects proceeded through several phases of development toward the goals of completing construction and beginning operation. These phases were (I) assessment and conceptual design, (II) feasibility and preliminary design, (III) financing and final design, (IV) construction, and (V) start-up and operation. The results of the projects as presented at the program summary meeting held in May 1983 at Georgetown University in Washington, D.C. are summarized. In all, 12 projects are included, plus a report on the state implementation pilot plan in Minnesota and two panel discussion conducted at the meeting - one on resolving barriers to GS-ICES and DHC systems and the other on implementation issues. A summary of the major conclusions of this meeting is given.

31105 **(DOE/CS/40117—T3) Development of closed-cycle gas turbines in district heating applications by 2000.** (Resource Planning Associates, Inc., Washington, DC (USA)). 31 Aug 1979. Contract AT03-76CS40117. 56p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84012822.

The maximum market for closed-cycle gas turbine/district heat (CCGT/DH) systems is defined, evaluating it in terms of both conventional alternatives and competitive district heating systems. The effect of practical implementation constraints on the market for CCGT/DH systems is discussed. Probable market development by the year 2000 and the energy savings to be expected as a result are discussed. Data on which the analysis is based are included. (MHR)

31106 **(DOE/ID/01570—T61) Cogeneration technology: a brief assessment.** Shane, M.K. (ed.). (EG and G Idaho, Inc., Idaho Falls (USA)). Dec 1982. Contract AC07-76ID01570. 112p. NTIS, PC A06/MF A01; GPO Dep. Order Number DE84012206.

This document includes discussions of cogeneration technology, its applications, and potential in Western's power marketing area. Legal and regulatory, institutional, and environmental factors to be considered are discussed. An example cogeneration project cost computation is then provided. Benefits of cogeneration projects are also discussed, along with pertinent developmental considerations. Sources of additional information and assistance are identified in Appendixes A and B.

31107 **(DOE/SF/11724—T1) Composition and properties of municipal solid waste and its components. Final report.** (Cal Recovery Systems, Inc., Richmond, CA (USA)). May 1984. Contract AC03-83SF11724. 101p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84011893.

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This is a compendium of data on the composition and properties of municipal solid wastes. The data are reported as follows: composition and properties of raw municipal solid waste, size distributions of municipal solid waste and its major components, and composition and properties of processed fractions and components. (MHR)

31108 **(EPRI-EM—3529) 1983 survey of utility end-use projects. Final report.** Blevins, R.P. (Synergic Resources Corp., Monroeville, PA (USA)). May 1984. 608p. EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920394.

Load control, thermal storage, dual fuel, efficient energy use, and end-use solar technologies are being examined more closely and with greater interest than ever before by the electric utility industry. This survey is a compilation of ongoing utility activities in these areas. Tabular information on 953 different utility projects is presented according to generic type, technology, and/or technique. Discussions of project strategies and benefits provide a broad overview of utility goals and objectives central to the pursuit of this work and the results obtained.

31109 **Resource recovery from solid wastes.** Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). 524p. (DOE/EV/10671—1; CONF-820565—). Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523. Order Number TI83005317. Contract FG05-81EV10671.

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Papers presented at the conference are included in this publication. Papers addressed such topics as: resource recovery techniques; nontechnical issues in resource recovery; microbiological studies; pollutant transport; control and characterization technology; combustion and pyrolysis; measuremnt and monitoring techniques; new products from waste; biochemical conversion; resource recovry in energy production; mechanical processes for resource recovery; landfill gas recovery; treatment for effluents; and Fossil-Energy Wastes Working Group. 51 separate absracts have been prepared for inclusion in the Energy Database. (DMC)

31110 **O'Connor Water-Cooled Rotary Combustor. A new proven technology.** Frenzinger, J.B. (O'Connor Envirotech Corp., Costa Mesa, CA). pp 31-33 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The water-cooled rotary combustor is a utility class boiler with an integrated water-cooled rotary burner. The burner enables the combustor to burn any type of solid or semi-solid fuel with either high moisture or high inert content. The combustor's development and advantages are summarized. (LEW)

31111 **Sumner County Solid Waste Energy Recovery Facility.** Parker, F.G.; McDaniel, T.L.; Cathcart, T.M. (Tennessee Valley Authority, Chattanooga, TN). pp 35-42 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

This paper describes the development of the Sumner County Solid Waste Energy Recovery Facility from its conception through startup. It includes the basis for the selection of the O'Connor Rotary Combustor Technology and outlines the basic design parameters. Construction and startup phases are described and a summary of project financing is given.

31112 **Baltimore County Resource Recovery Facility.** Albrecht, C.R. (Maryland Environmental Service, Annapolis). pp 55-64 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The Baltimore County Resource Recovery Facility has operated for five years processing municipal solid waste into refuse derived fuel and recovering ferrous metals and glass. The purpose of the facility is to demonstrate the technology of resource recov-

ery, test the marketability of recovered materials and develop an economical recovery system. The work on recovering ferrous metals and mixed glass has resulted in marketable products and contacts with users. Efforts to market the RDF have included development of several different grades of fuel, test burns at industrial plants, federal and state institutions and public utility power generating stations. Present planning is to supply refuse derived fuel to the Baltimore Gas and Electric Company under a long term contract.

31113 **Case studies of four operating resource recovery facilities.** Brown, M.D.; Vence, T.D. (Brown, Vence and Associates, San Francisco, CA). pp 65-76 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Four case studies are presented of currently operating resource recovery facilities in the United States. The facilities were designed to process from 200 to 1150 tons per day (TPD) of municipal solid waste (MSW). The studies examine the variety of technologies available and compare their reliability; maintenance of an adequate waste supply; potential markets for energy products; initial planning support; associated environmental impacts; permitting requirements and available financing methods. The facilities are located in Akron, OH; Auburn, ME; Saugus, MA; and Madison, WI.

31114 **Economic assessment of refuse recycling plants at the feasibility study stage.** Esposito, A. (Azienda Servizi Municipalizzati, Brescia, Italy). pp 77-86 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The town of Brescia has investigated the possibility of a refuse recycling plant of 700 tonnes/day capacity. On the basis of manufacturers' proposals and of invariable operating conditions, a feasibility study has been made, using the Discounted Cash Flow (DCF) method to give a fully developed economic assessment.

31115 **Environmental and economic considerations in resource recovery.** Sachdev, D.R.; Dul, E.F.; Richie, P.C. (Envirosphere Co., New York, NY). pp 87-96 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

This paper summarizes the permitting protocol that a resource recovery facility will typically have to undergo. The federal and state regulatory requirements concerning Air Quality, Water Quality and Solid Waste have been discussed both qualitatively and quantitatively. The health impacts of the resource recovery facility, particularly in the areas of noise, dust emissions and explosion potential, have been evaluated. The capital and operation costs can be widely impacted based on the ownership, facility capacity and operation schedules. The paper also presents the typical costs of a 720 ton per day facility utilizing different technologies.

31116 **Process to ferment food waste and monitor the effect on harmful organisms.** Dickens, J.A.; Vaughn, R.E.; Shotts, E.B.; Wooley, R.E.; Gilbert, J.P.; Jones, M.S.; Waltman, D.W. (USDA-Agricultural Research Center, Athens, GA; Univ. of Georgia, Athens). pp 109-116 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A system for monitoring and sampling fermented edible food waste was developed to determine the feasibility of using the material as a livestock feed ingredient. The garbage was inoculated with various pathogens to determine if a fermentation process would eliminate them. The pH, redox and temperature were monitored and recorded every 15 minutes for runs of 3 to 9 days and samples were taken daily to determine if the pathogens were recoverable. 4 references, 4 figures.

31117 **Survival of viruses in fermented edible waste.** Gilbert, J.P.; Wooley, R.E.; Shotts, E.B. Jr.; Dickens, J.A.; Jones, M.S.; Waltman, W.D. (Univ. of Georgia, Athens; USDA, Agricultural Research Center, Athens, GA). pp 117-123 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The feeding of uncooked garbage to livestock has been prohibited by law to prevent the spread of disease. The use of a Lactobacillus fermentation process for recycling edible wastes, which is both energy efficient and results in safe animal feed, appears to have merit. Both qualitative and quantitative reisolations of selected viruses placed in this process were carried out in conjunction with pH and temperature studies. Selected viruses included pseudorabies, frog virus 3, Newcastle, infectious canine hepatitis, a porcine picorna, bovine viral diarrhea, avian infectious bronchitis, measles, and vesicular stomatitis. Viruses labile to low pH did not survive the fermentation process and were inactivated rapidly at 40°C, but slower at lower temperatures. Temperature and pH stability studies showed that high temperature did not have as great an effect on inactivation of these viruses as did low pH. 17 references, 1 table.

31118 **Mass burning systems for solid waste.** Beckman, A.H. (Fulton Iron Works Co., St. Louis, MO). pp 191-200 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Incineration is the ideal alternative to landfilling as the final disposition of municipal solid waste. Incineration has the advantages of: 90% volume reduction to a completely odorless inert product; potential for recovery of valuable heat energy; and existing technology to remove dust and pollutants from the flue gas to meet the most severe environmental requirements. Seghers Engineering of Brussels, Belgium owns a proven incinerator furnace system which is similar to other refractory or water wall mass burning systems. This presentation introduces mass burning, gives its advantages and describes a typical system. brief comments on operation and financing are included.

31119 **Characterization of slag and fouling residues from co-combustion of powdered refuse-derived fuel with residual oil and comparison with coal and RDF residues.** Hasselriis, F.; Robbins, C.R. (National Bureau of Standards, Washington, DC). pp 201-210 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

X-ray diffraction analysis, in laboratory furnace heating studies of four RDF samples produced by different processing methods, and four basic types of coals, of ash formed at successively higher furnace temperatures showed the changes in crystalline phases of the ash residues. Silicates, carbonates, sulfates and oxides formed in a complex process depending on the proportions of available materials and temperature dependent formations, facilitated by the fluxing action of the quartz and glass in RDF. Similar analyses of a powdered refuse-derived fuel (Eco-Fuel) burned in a cyclone furnace of a utility boiler, as well as slag, fouling and flyash samples collected from the boiler after co-firing with No. 6 fuel oil, are compared with atomic absorption analysis of the same samples and of other refuse-derived fuels, indicating the fates of fuel iron, sulfur, alumina, calcium, sodium and magnesium in the fuel, and revealing the volatilization and condensation of sodium on fouling deposits and particulate, and the combination of fuel sulfur with iron and other minerals to form sulfates which leave as slag or particulate rather than as stack emissions. The influence of slag chemistry on ash fusion temperatures and fouling depsoits was noted.

31120 **Burning municipal refuse in Tomorrow's Power Plant Today.** Hiers, C.W.; Libey, J.A.; Wisely, F.E. (Dept. of Electric and Water Utilities, Lakeland, FL; Horner and Shifrin, Inc., St. Louis, MO). pp 211-218 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The City of Lakeland's C.D. McIntosh Jr. Power Plant, Unit 3 is spoken of as Tomorrow's Power Plant Today because of the many innovative technologies dealing with pollution control and burning municipal refuse as a supplemental fuel in a large electric utility boiler.

31121 **Environmental consequences arising from the combustion of municipal solid waste.** Tsang, W.; Shaub, W. (National Bureau of Standards, Washington, DC). pp 219-228 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The combustion of municipal solid waste for energy recovery has been examined in terms of the factors that control the emission levels of SO/sub x/, NO/sub x/, flyash and organics. It is concluded that in comparison to coal systems; organic emissions will be a more serious problem, flyash emissions will be somewhat larger, while NO/sub x/ and SO/sub x/ emissions will be smaller and much smaller, respectively. The important factors that control organic emissions; the nature of the compounds formed as well as their thermal stability and reactivity are considered and the importance of temperature is emphasized. The available experimental results are examined and some measures for assuring sufficiently low levels of organic emissions are suggested.

31122 **Don't bury it - burn it (an advanced concept of utilizing municipal waste).** Corson, M.J.; Burton, R.M. Jr. (Rochester Gas & Electric Corp., Rochester, NY). pp 229-236 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Rochester Gas and Electric Corporation (RG & E) is working with the County of Monroe to recover energy from municipal solid waste. RG & E has been burning Refuse-Derived Fuel (RDF) from the County's Resource Recovery Facility since September, 1981. The Company has agreed to purchase as much of the RDF as it can utilize to be burned with coal at Russell Station, the major coal-fired electric generating plant in its system. The price that RG & E pays for the RDF is keyed to the price of coal so that the utility will neither benefit nor penalize its customers and stock holders. To evaluate the co-firing of coal and RDF, RG & E initiated a comprehensive RDF Testing and Evaluation Program. This two million dollar research project will examine in detail the environmental, corrosion, and boiler efficiency impact of burning refuse derived fuel.

31123 **Pilot and full-scale tests of primary trommels used to improve quality of refuse-derived fuel.** Hasselriis, F.; Menon, N.V.P. (Petrochem Development Corp., New York, NY). pp 237-245 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Trommel screens are effective in separating components of municipal solid waste (MSW), reducing shredding power, removing glass, grit and other non-combustibles, and recovering combustibles, to improve quality and yield of refuse-derived fuel (RDF). To apply trommels effectively, data are required, relating trommel effectiveness and capacity to trommel dimensions, screen hole size, and feed characteristics and processing objectives. Screening tests of raw MSW must be performed using full-size machines due to the large particles in refuse, and the need to break containers and glass. Field testing of operating trommels is limited by the available range of speed, retention time, feed or discharge rates, and difficulty in changing hole size and configuration. Pilot trommels can be used to test various types of MSW, over a wide range of feed rates, rotational speeds and retention times, permitting accurate weighing, sampling of input and output streams, and analysis of feed and product streams. Comprehensive testing has been done on laboratory, full-size pilot and operational trommels, to determine the complex relationships between trommel dimension, inclination and rotational speed with residence time, capacity and screening efficiency for MSW and its various components. Mathematical modeling can predict performance, interpret and extrapolate data, relate pilot tests to full-scale operation, and select the best process configuration for optimum quality and recovery of combustibles, and other objectives.

31124 **Helium-neon laser remote measurement of methane.** Grant, W.B. (Jet Propulsion Lab., Pasadena, CA). pp 265-274 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A helium-neon laser system was developed and used to remotely measure methane gas concentrations in a solid-waste landfill site. The differential absorption technique is used with topographic targets or retroreflectors to provide the backscattered signal. The design of a second generation system is discussed.

31125 **Measuring the physical characteristics of densified refuse derived fuel.** Eimers, J.L.; Vesilind, P.A. (Duke Univ., Durham, NC). pp 275-283 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Tests were developed to characterize the storage and handling properties of densified refuse derived fuel [dRDf], including sample collection and division, air drying and measurement of bulk density, total or residual moisture content, water adsorbancy, density, particle size and durability. These methods will be useful to producers, users and researchers of densified refuse derived fuels.

31126 **Introduction and reisolation of selected gram-positive and gram-negative bacteria from fermented edible wastes.** Talkington, F.D.; Shotts, E.B. Jr.; Wooley, R.E.; Jones, M.S.; Dickens, J.A.; Gilbert, J.P.; Waltman, W.D. (Univ. of Georgia, Athens; USDA, Agricultural Research Center, Athens, GA). pp 339-342 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Eleven bacteria were individually tested for their ability to survive in edible food waste during fermentation with Lactobacillus acidophilus. The bacteria in this study were comprised of the following gram-negative: Salmonella typhimurium, Salmonella anatum, Salmonella cholerae-suis, Yersinia pseudotuberculosis, Yersinia entercolitica, and Pasteurella multocida dn the following gram-positive bacteria were used: Group E Streptococcus, Listeria monocytogenes, Erysipelothrix rhusiopathiae, Corynebacterium pseudotuberculosis, and Clostridium perfringes. These bacteria were dispersed into the garbage concomitantly with the Lactobacillus and the mixture was fermented at 5°C, 10°C, 20°C, and 30°C over a 96-hr period. Temperature, pH, and redox values were electronically calculated and recorded each quarter hour. Garbage was sampled and cultured daily as per routine diagnostic procedures. Qualitative and quantitative (where possible) determinations were made. The gram-negative organisms survived 72 to 96 hr of fermentation at 5°C and 10°C, but were killed at 20°C and 30°C in 24 to 48 hr. Erysipelothrix survived the 5°C fermentation but was destroyed by the forty-eighth hr in the remaining temperatures. The

remaining gram-positives were never reisolated at any temperature. 13 references.

31127 **Biogasification of screened RDF and sewage sludge.** Golueke, C.G.; Diaz, L.F.; Larson, L.E. (Cal Recovery Systems, Inc., Richmond, CA; Southern California Edison Co., Rosemead, CA). pp 343-352 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Separating refuse derived fuel into two fractions, digestible and combustible, can potentially increase the overall energy output when a gaseous fuel is the desired product. Operational parameters and performance characteristics involved in the gasification of the digestible fraction were investigated at laboratory-scale (50-gal reactor) and pilot-scale (440-gal reactor) levels. In the laboratory studies, gas production per pound of volatile solids introduced dropped from 9.0 ft^3 at an organic loading rate (OLR) of 0.07 lb. VS/ft^3-day to 4.0 ft^3 at an OLR of 0.25 lb at both 20- and 30-day detention periods. The percent destruction of volatile solids was reduced from 75 percent to 30 percent respectively. In the pilot-scale studies, gas production dropped from 5.3 ft^3 at an OLR of 0.1 lb VS/ft^3-day to 3.80 ft^3 at 0.3 lb Vs/ft^3-day. The corresponding percent destruction of volatile solids dropped from 33 percent at the 0.1 OLR to 43 percent at the 0.3 OLR. Energy recovered as methane per ton of digestible refuse fraction was 765,000 Btu.

31128 **Cofiring of RDF at the C.P. Crane Station: 1980 test results and future plans.** Bourquin, R.H. Jr. (Baltimore Gas & Electric Co., MD). pp 359-366 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

During the summer of 1980, RDF was burned as a supplemental fuel at Baltimore Gas and Electric Co.'s Charles P. Crane Unit No. 2. A description of the equipment and fuel, plus data from this test is presented. Plans for a long term test of RDF cofiring on an expanded basis are discussed.

31129 **Energy recovery from mass burning of municipal solid wastes.** Walls, T.B. (Ontario Hydro, Toronto). pp 367-386 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

One of the older stations, R.L. Hearn GS, is situated on the waterfront of downtown Toronto - a city of 2.5 million people. Five out of a total of eight units have been mothballed at R.L. Hearn GS due to a lack of electrical demand. This study was largely motivated by a desire to make better use of these facilities. Ontario Hydro has considered various schemes to utilize the R.L. Hearn Generating Station in burning refuse to produce steam for the city of Toronto and produce electricity. One scheme is reported here. Aspects covered are: refuse quantities and analysis; steam quantities and transmission details; preliminary engineering design; capital and operating costs; cashflows for the life of the plant; sensitivity analyses; and environmental impact assessment.

31130 **Waste heat recovery at municipal solid waste incinerators: test program implemented at New York City's Southwest Brooklyn Incinerator.** Chesner, W.; Barbara, M.; Thau, A.; Berkowitz, W.; Weston, R.F. (Engineering Consultants and Associates, Commack, NY; Roy F. Weston, Roslyn, NY; Power Authority of the State of New York, NY; City of New York Dept. of Sanitation, NY). pp 387-395 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A six-day field sampling program was designed and implemented at the 908 metric tons/day (1000 tons/day) Southwest Brooklyn Incinerator in New York City, with the primary goal being the determination of the total heat content of the flue gases available for energy recovery at a refuse throughput of 227 metric tpd (250 tpd). The flue gas flowrate and temperature from one of four furnaces was determined to be approximately 1211 m^3/min (42,800 scfm) at 760°C (1400°F). It was determined that the flue gases from the four furnaces, when cooled in the proposed waste heat boilers, from 760°C (1400°F) to 232°C (450°F), will yield a total energy of 190,000 J/hr (200 million Btu/hr).

31131 **Factors influencing glass particle transport in vertical air classifiers.** Saul, C.; Peirce, J.; Vesilind, P.A. (Duke Univ., Durham, NC). pp 397-406 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Mechanisms that contribute to glass contamination of refuse derived fuel (RDF) processed in a vertical air classifier are studied, and endogenous and oxogenous system modifications are suggested to control the contamination. Vertical air classifiers are used to extract the organic fraction of municipal solid waste (MSW) in RDF production facilities across the nation. However, unit operations preceding these classifiers tend to produce glass particles which, despite a relatively high density, are extracted with the organics once they reach the classifier. Experience in burning the RDF indicates critical problems are associated wtih the presence of these inorganic fines in the fuel, including: excessive slagging on incinerator walls, abrasion of mechanical parts, and reduced energy content. This research investigates the relationships between glass particle size and velocity, and details the effects paper particles and moisture have on glass particle transport in an air classifier. The results suggest changes in the operation of air classifiers, and imply designs for selected unit operations which proceed the classifiers. Future research needs are highlighted.

31132 **Differential crushing: the basic principle of glass-free RDF manufacturing.** Chakravarti, A. pp 407-416 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Size analyses of shredded municipal solid waste as a tool for developing resource recovery process flowsheets are highlighted. The discussion focuses on a concept that by a combination of differential crushing and selective screening glass and grit in refuse can be completely separated from a portion of combustibles. It introduces an analytical basis for specifying performance of size reduction and sizing equipment needed in such systems. A mechanical processing scheme for preparation of two commercial grades of refuse derived fuel (RDF) is presented along with a process flowsheet delineating the concept. Potential benefits of this two grade RDF production are also identified.

31133 **Landfill gas recovery: state of the art in Italy. A feasibility study for one of the biggest Italian landfills.** Vanni, A.; Esposito, A. (Univ. of Turin, Italy; Azienda Servizi Municipalizzati, Brescia, Italy). pp 417-424 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

In Italy, a government sponsored project is funding research into the production of landfill gas (LFG). Research on various sites is quoted and the work on five LFG projects is summarized. A feasibility study for a particular site near Brescia shows that there are several economically viable ways of using the gas.

31134 **Enhancement of gas production in sanitary landfill sites. Experiences in West Germany.** Stegmann, R.; Ehrig, H.J. (Technische Univ., Braunschweig, Germany). pp 425-434 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Enhancement of biological degradation processes can prove to be advantageous in regard to emission control and gas utilization. Anaerobic degradation processes of municipal solid waste (MSW) were studied in laboratory - half technical and full scale. As a result suggestions for modified landfill operation techniques are presented. At a sanitary landfill in Lingen two different operation technques are tested.

31135 **Generation of electricity from landfill gas in Germany and in particular at the utilization plant AM Lemberg near Stuttgart.** Rettenberger, G. (Univ. Stuttgart, Germany). pp 435-446 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

A short overview is given on the five landfill gas to electricity plants which use internal combustion engines and were set into operation in 1981/82 in West Germany. The plant at the landfill Am Lemberg near Stuttgart, is described in detail. It is the only one that works automatically with changing gas heating values from 200 to 600 Btu/scf.

3209 Education And Public Relations

REFER ALSO TO CITATION(S) 31032, 31051, 31055, 31086

31136 **(DOE/CS/69023—T1) District of Columbia Energy Extension Service Non-Pilot State Grant Program. Final report.** (District of Columbia Energy Office, Washington (USA). Residential Energy Programs Div.). 08 May 1984. Contract FG01-78CS69023. 18p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011208.

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The following aspects of the program are reviewed: background, goals, objectives, approach, results, accomplishments and program design. (MHR)

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS

3301 Internal Combustion Engines

REFER ALSO TO CITATION(S) 31139

3303 Electric-powered Systems

31137 **(DOE/NV/10113—1) Final progress report on the Electric Vehicle Project.** Sprague, M.E. (Portland Parks and Public Works, OR (USA)). 18 Apr 1984. Contract FC08-80NV10113. 3p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011788.

Operating experience on the electric vehicle project, costs, and problems encountered are reviewed. (MHR)

3306 Vehicle Design Factors

31138 **(VW-FMT—825V/5) Encapsulation technology for cars of today and tomorrow.** (Volkswagenwerk A.G., Wolfsburg (Germany, F.R.)). 24 Mar 1982. 46p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84751258.

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Since 1965 several authors have developed and introduced noise abatement capsules in order to diminish the noise of vehicles. This report gives a survey on the state of capsule development for passenger cars and commercial vehicles by describing 20 concepts which were developed and realised. Various capsule-types can be classified as "engine capsule" which can be regarded as parts of the engine, and "body capsules" which use parts of the car's body to enclose the engine compartment. Another criterion for distinguishing the models is the air flow: cooling air can be channelled behind the cooler through the capsule room (tunnel capsule); this type is built as an engine capsule. Cooling air can also be channeled around - above, underneath or alongside - the capsule. The capsule room partly by cooling air ducts in critical temperature areas. This type can be used for engine- and body capsules. Only a few capsules have been used for serial production (VOeV-Standard-routine bus, VW-bus D, VW-mini-truck). Capsules will most certainly be used for commercial vehicles in future, the definite time however depends on the development of legislation and demand. For passenger cars capsules will be used only if engine and gearbox-measures are insufficient to achieve the desired values.

3308 Alternative Fuels

REFER ALSO TO CITATION(S) 30441, 30471

31139 **Injection, atomization and combustion of Carbon slurry fuels.** Ryan, T.W.; Callahan, T.J.; Dodge, L.G.; Moses, C.A. (Energy Systems Research Div. Southwest Research Institute). *SAE (Society of Automotive Engineers) Special Publication;* **SP-527**: 101-115(Oct 1982). Contract AC04-78CS54240.

Three different carbon blacks were used to formulate nine different slurries in DF-2. The rheological properties of each formulation were examined to determine deviations from Newtonian behavior. The spray characteristics of selected formulations were then examined in a highpressure, high-temperature injection bomb. The cone angle decreased and the penetration rates increased for all of the slurries tested as compared to straight DF-2. These changes were more pronounced as the concentration of carbon black increased. Six formulations of three types of carbon black were tested in a single-cylinder, direct injection CLR engine. Apparent heat release rates were computed as a function of crankangle from the cylinder pressure data. Based on the engine performance tests and some limited durability testing it appears that wellformulated carbon black slurries have only minor effects on engine performance and durability.

36 MATERIALS

REFER ALSO TO CITATION(S) 31003

31140 **(CONF-8404110—4) Diffusion-limited evaporation: a Monte Carlo approach.** Murch, G.E. (Argonne National Lab., IL (USA)). 1984. Contract W-31-109-ENG-38. 22p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012106.

From 4. international conference on high temperature science - HYTHERM; Santa Fe, NM, USA (2 Apr 1984).

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The phenomenon of diffusion-limited evaporation is discussed with emphasis on its description using the diffusion equation. When the diffusion coefficient is a function of concentration of the evaporating species (as is usually the case), the diffusion equation is not in general amenable to analytical solution. A simple but very powerful Monte Carlo method recently developed by the author is described and applied to the problem. The method makes use of a lattice gas artifice for the representation of the system and the diffusion coefficient of the evaporating species. Example results are given for several forms of the concentration dependence of the diffusion coefficient and boundary conditions of the system.

31141 **(DL/SCI/R—19) Application of synchrotron radiation to problems in materials science. Proceedings.** Bowen, D.K. (comp.). (Daresbury Lab. (UK)). 1983. 111p. (CONF-8211147—). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780161.

From Daresbury study on application of synchrotron radiation to problems in materials science; Daresbury, UK (13 Nov 1982).

Abstracts of individual items from the proceedings were prepared separately for the data base. (GHT)

31142 **(LBL—17734) Continuum theory for fiber suspensions.** Lipscomb, G.G.; Keunings, R.; Marrucci, G.; Denn, M.M. (Lawrence Berkeley Lab., CA (USA)). May 1984. Contract AC03-76SF00098. 9p. (CONF-841076—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012258.

From 9. international congress on rheology; Acapulco, Mexico (8 Oct 1984).

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A continuum constitutive equation is obtained for suspensions of rigid rodlike fibers in a viscous Newtonian medium, enabling simultaneous calculation of the kinematics, stress distribution, and fiber orientation distribution. A closure approximation in deriving the equation has little effect in flows where an exact solution for the orientation distribution can be obtained. A finite element procedure is developed for the solution of boundary value problems in complex geometries like those encountered in processing. Special care is required because of a near-singularity at solid boundaries where the kinematical no-slip condition is satisfied.

3601 Metals And Alloys

REFER ALSO TO CITATION(S) 30099, 30110, 30308, 30440, 30703, 30704, 30705, 30716, 30741, 30759, 30759, 30773, 30773, 30777, 30813, 30963, 31002, 31038, 31039, 31048, 31303, 31330, 31339, 31340, 31343, 31349, 31356, 31421, 31422, 31696, 31886, 31888, 32262

31143 **(AECL—7773) Neutron and x-ray scattering studies of ferroelectric phase transitions.** Dolling, G. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Aug 1982. 61p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701780.

The subject of ferroelectric type phase transitions is introduced by means of examples of two main classes (a) displacive transitions, e.g. $KNbO_3$, and (b) order-disorder transitions, e.g. $NaNO_2$. The significance of crystal structure and crystal dynamics (i.e. the phonon dispersion relations) for ferroelectric behaviour is emphasized. The chief methods for structure determination are x-ray and neutron diffraction, while the most powerful of all techniques for studying phonon properties is that of coherent inelastic neutron scattering. The most useful type of neutron spectrometer for phase transition studies, the triple axis crystal spectrometer, is discussed in detail. The history of the soft mode theory of displacive phase transitions, and its application to the antiferroelectric and 'almost ferroelectric' transitions in $SrTiO_3$, provides an introduction to more recent developments in this area, including over-damped soft modes, central peaks and critical scattering, incommensurate phase transitions (e.g. K_2SeO_4), amplitudons, phasons and finally solitions. The treatment throughout is descriptive and introductory, designed for graduate students.

31144 **(CONF-840604—6) Evolution of cavity microstructure in ion-irradiated 316 SS and Fe-20Ni-15Cr alloy.** Kohyama, A.; Loomis, B.; Ayrault, G.; Igata, N. (Tokyo Univ. (Japan); Lawrence Livermore National Lab., CA (USA)). Apr 1984. Contract W-31-109-ENG-38. 30p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012111.

From 12. international symposium on effects of radiation on materials; Williamsburg, VA, USA (18 Jun 1984).

The effect of helium implantation schedule on the evolution of the cavity microstructure in 316 SS and Fe-20Ni-15Cr alloy during heavy-ion irradiation was investigated for damage levels up to 100 dpa with three helium injection schedules, i.e., 15 appm He/dpa, 50 appm He/dpa and 15 appm He preinjected prior to Ni^+ ion irradiation. In the case of the dual-ion irradiated specimens, there was a trend towards a saturation of the swelling with increasing damage level that was closely related to the saturation and subsequent decrease of the number density of the small cavities (<8 nm diameter for 316 SS and <4 nm for Fe-20Ni-15Cr) and the dislocation density. The bi-model cavity size distribution that was determined for the Fe-20Ni-15Cr alloy at 40 dpa changed to uni-modal distribution at 65 and 100 dpa. Radiation-induced segregation was high and this was related to the saturation tendency for the swelling.

31145 **(CONF-8404148—1) Steel castings by the electroslag casting technique.** Sikka, V.K.; Mitchell, A. (Oak Ridge National Lab., TN (USA); British Columbia Univ., Vancouver (Canada). Dept. of Metallurgical Engineering). 1984. Contract AC05-84OR21400. 41p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011632.

From American Foundrymen Society casting congress; St. Louis, MO, USA (30 Apr 1984).

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ELectroslag casting facilities in Canada and the United States were reviewed. Several valve body castings of 2-1/4 Cr-1 Mo, 9 Cr-1 Mo, and 18% Cr-8% Ni(Mo) steels were made at the University of British Columbia facility. These castings were examined for surface finish, chemical segregation, and macrostructure in the as-cast condition and after various heat treatments. Castings were subjected to tensile, Charpy impact, and creep testing. Results of these tests were compared with similar data on wrought material and sand castings.

31146 **(CONF-8404150—1) Truncation-induced relaxations of a high-index surface: Al(311).** Noonan, J.R.; Davis, H.L.; Erley, W. (Oak Ridge National Lab., TN (USA)). Apr 1984. Contract AC05-84OR21400. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011640.

From European conference on surface science; York, UK (1 Apr 1984).

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The atomic structure of the Al(311) surface has been determined using Low Energy Electron Diffraction (LEED). The surface unit cell was found to be in lateral registry with the bulk lattice. However, there are large vertical relaxations of the first and second atomic planes perpendicular to the surface. The first interplanar spacing, d_{12}, is contracted by 13% relative to the bulk value and d_{23} is expanded by 9%. Even though no lateral displacements were found to exist at the surface, the comparison of calculated and experimental LEED spectra was found to be sensitive to lateral displacements, which is contrary to commonly held beliefs concerning LEED analysis.

31147 **(DOE/ER/10708—T2) Role of sintering in the oxidation-reduction of palladium powders.** Munir, Z.A.; Coombs, P.G. (California Univ., Davis (USA). Div. of Materials Science and Engineering). 1983. Contract AT03-80ER10708. 15p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011202.

An investigation of the influence of grain boundary formation through sintering on the successive oxidation-reduction of palladium powders was conducted over the temperature range 575 to 650°C. Loose powders were heated in air and their rate of oxidation was monitored continuously up to 100 hours. Subsequent reduction and oxidation cycles resulted in successively lower levels of oxidation.

31148 **(EGG-SCM—6577) Surface modification and coatings: a technical assessment.** Tompkins, H.G. (EG and G Idaho, Inc., Idaho Falls (USA)). Apr 1984. Contract AC07-76ID01570. 29p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012483.

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The processes of surface alteration and coating are reviewed, with attention to the state-of-the-art. The surface alteration assessment focuses on laser surface melting whereby a rapid solidification effect is obtained. The assessment on coatings reviews physical vapor deposition (PVD), chemical vapor deposition, and spraying techniques. The assessment focuses on the PVD technique of sput-

ter deposition. The relationship between rapid solidification and the various processes is discussed. Bibliography.

31149 **(HEDL—7405) Evaluation of ferritic alloy Fe-2-1/4Cr-1Mo after neutron irradiation - irradiation creep and swelling.** Gelles, D.S.; Puigh, R.J. (Hanford Engineering Development Lab., Richland, WA (USA)). Oct 1983. Contract AC06-76FF02170. 31p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012368.

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Irradiation creep and swelling measurements are reported for Fe-2-1/4Cr-1Mo after irradiation by fast neutrons over the temperature range 390 to 560°C. Diameter change measurements on thin walled pressurized tubes in a bainitic condition and density change measurements on rods in a nonstandard condition were made following irradiation in the Experimental Breeder Reactor II. The irradiation creep specimens were irradiated to a fluence of 5.7×10^{22} n/cm^2 ($E > 0.1$ MeV) or 30 dpa and the swelling specimens were irradiated to a peak fluence of 2.4×10^{23} n/cm^2 or 115 dpa. These results have been used as a basis to establish in-reactor creep and swelling correlations for 2-1/4Cr-1Mo in a bainitic condition. The correlations predict moderate swelling and moderate irradiation enhanced creep at 390°C.

31150 (INIS-BR—107, pp 3) **Experimental study of the electric field gradient in In_5Bi_3.** Fries, S.G.; Jornada, J.A.H. da; Maciel, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31151 (INIS-BR—107, pp 3-4) **Temperature dependence of the EFG in In in the compound Tl_5Te_3.** Maciel, A.; Fries, S.G.; Jornada, J.A.H. da; Livi, R.P.; Fraga, E.R. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31152 (INIS-BR—107, pp 4-5) **Nuclear quadrupole interaction study of high pressure phase transition in In-Bi intermetallic compounds.** Fries, S.G.; Jornada, J.A.H. da; Livi, R.P.; Maciel, A.; Fraga, E.R. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31153 (INIS-BR—107, pp 6) **Temperature dependence of the electric field gradient in $AgIn_2$.** Brunnet, L.G.; Behar, M.; Iglesias-Sicardi, J.R.; Jornada, J.A.H. da; Livi, R.P.; Saitovitch, H. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31154 (INIS-BR—107, pp 6-7) **Effect of high pressure on the order-disorder transitions in Fe-Ni alloys.** Oliveira, L.S. de; Jornada, J.A.H. da (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31155 (INIS-BR—107, pp 7) **Detrapping of vacancies at ^{111}In in quenched silver.** Alonso Arias, C.; Filevich, A.; Garcia Bermudez, G. (Comision Nacional de Energia Atomica, Buenos Aires (Argentina)); Behar, M.; Livi, R.P.; Zawislak, F.C. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31156 (INIS-BR—107, pp 8-9) **^{57}Fe Moessbauer study in the ternary hydrides of $ErFe_3$.** Cunha, J.B.M. da; Viccaro, P.J.; Vasquez, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31157 (INIS-BR—107, pp 11-12) **Spin-reorientation in (Er sub(1-x) Gd sub(x))Fe_3 compounds.** Cunha, J.B.M. da; Viccaro, P.J.; Vasquez, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31158 (INIS-BR—107, pp 12) **Hyperfine field determination for wolframite $(Fe,Mn)WO_4$.** Kunrath, J.I.; Mueller, C.S.; Vasquez, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31159 (INIS-BR—107, pp 14) **Self-consistent model calculation of the electronic structure of ordered, disordered and hydrogenated Pd_3Fe.** Correa, M.H.P.; Vasquez, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Silva, C.E.T.G. da (Universidade Estadual de Campinas (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31160 (INIS-BR—107, pp 28) **Thermopower and resistivity in amorphous Mg sub(1-x) Zn sub(x) alloys.** Baibich, M.N. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Muir, W.B.; Altounian, Z.; Guo-Hua, T. (McGill Univ., Montreal, Quebec (Canada). Dept. of Physics). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31161 (INIS-BR—107, pp 28-29) **Thermopower and resistivity in amorphous Cu sub(1-x) Zr sub(x) alloys.** Baibich, M.N. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Muir, W.B.; Altounian, Z.; Guo-Hua, T. (McGill Univ., Montreal, Quebec (Canada). Dept. of Physics). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31162 (INIS-BR—107, pp 29-30) **Electrical resistivity of the Ni_2Mn(Sn sub(1-x)In sub(x)) Heusler alloys.** Fraga, G.L.F.; Kunzler, J.V.; Brandao, D.E. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31163 (INIS-BR—107, pp 31-32) **Electrical resistivity of the Ni_2Mn(In sub(1-x) Sn sub(x)) Heusler alloys.** Fraga, G.L.F.; Kunzler, J.V.; Brandao, D.E. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31164 (INIS-BR—107, pp 32) **Electrical resistivity of Heusler alloy.** Schreiner, W.H.; Brandao, D.E.; Ogiba, F.; Kunzler, J.V. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31165 (INIS-BR—107, pp 33) **Electrical resistivity of the Ni_2MnSn Heusler alloy.** Ogiba, F.; Schreiner, W.H.; Kunzler, J.V.; Brandao, D.E. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31166 (INIS-BR—107, pp 33) **Electrical resistivity of the Cobalt-rich Co-Fe alloys.** Pureur, P.; Kunzler, J.V.; Schreiner, W.H.; Brandao, D.E. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31167 (INIS-BR—107, pp 34-35) **Magnetostriction of Pd-Fe alloys and the split band model.** Schmidt, J.E. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Physics). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31168 (INIS-BR—107, pp 35-36) **Magnetoelastic properties of amorphous alloys.** Baibich, M.N.; Schmidt, J.E. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31169 (INIS-BR—107, pp 36) **Magnetostriction of some Heusler alloys.** Schreiner, W.H.; Schmidt, J.E. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31170 (INIS-BR—107, pp 36-37) **Magnetoresistance of Pd-Fe and Pd-Ni-Fe alloys.** Hsu, Y.; Gupta, M.; Jen, S.; Berger, L. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Physics); Schmidt, J.E. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31171 (INIS-BR—107, pp 38-40) **Electronic transport in amorphous superconductors.** Baibich, M.N. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Muir, W.B. (McGill Univ., Montreal, Quebec (Canada). Dept. of Physics). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31172 (INIS-mf—8740) **Neutron- and X-ray diffraction investigations for the metallic glasses $Ni_{81}B_{19}$ and $Co_{80}P_{20}$.** Sperl, W. (Stuttgart Univ. (Germany, F.R.). Fakultaet 12 - Physik). 12 Nov 1982. 99p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE84780369.

By means of isotope substitution for three chemically and technically identical amorphous $Ni_{81}B_{19}$ samples neutron diffraction experiments are performed and the partial structure factors and the partial pair correlation functions are determined.

31173 (INIS-mf—8741) **Moessbauer spectroscopy at the 93.3 KeV gamma transition at Zn-67.** Forster, A. (Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet fuer Physik). 2 Feb 1981. 125p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780365.

This work presents the result of a Moessbauer effect study at the zinc-67 isotope. The 93.3 KeV gamma transition has the highest energy resolution of all accessible Moessbauer transitions. Source and absorber we cooled down to 4.2 K. The aim of the examination was 1) development of a method for solid state physical measuring of Moessbauer-resonances with high resolution and 2) to test this method to study the hfs parameters for ZnO, ZnS, ZnSe, ZnTe and ZnF_2. (KHF).

31174 (INIS-mf—8901, pp 232) **Orientation of adsorbed formate ions on Pt(110).** Hofmann, P.; Bare, S.R.; Richardson, N.V.; King, D.A. (Liverpool Univ. (UK) Donnan Labs.). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

31175 (INIS-mf—8901, pp 237-241) **Coadsorption and reaction of H_2 and CO on Raney nickel: Neutron vibrational spectroscopy.** Kelley, R.D. (National Bureau of Standards, Washington, DC (USA). Surface Science Div.; Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Grenzflaechenforschung und Vakuumphysik). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Neutron vibration spectroscopy is used to study the adsorption and reaction of H_2 and Co on a catalytic nickel surface. The sample was first exposed to H_2 and then to CO. At low temperatures there is no change of vibrational modes of H in the three-fold site; at a higher temperature changes occur. Some conclusions are drawn on the reaction product.

31176 (INIS-mf—8921, pp 69) **Inhomogeneity effects in the magnetoresistance measurements in thin mixture films of In-Ge.** Palevski, A.; Kapitulnik, A.; Deutscher, G. (Tel Aviv Univ. (Israel). Dept. of Physics and Astronomy). 1983. NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780235. (CONF-8303128—Summ.).

From Israel Physical Society annual meeting; Ramat-Gan, Israel (24 Mar 1983).

31177 (INIS-mf—8934, pp 290-291) **High temperature magnetic after-effect in commercial non-oriented iron-silicon steel following neutron irradiation and plastic deformation.** Blythe, H.J. (Sheffield Univ. (UK). Dept. of Physics); Walz, F. (Max-Planck-Institut fuer Metallforschung, Stuttgart (Germany, F.R.). Inst. fuer Physik). Jul 1983. NTIS (US Sales Only), PC A18/MF A01. Order Number TI84780273. (CONF-8309217—Absts.).

From 6. European conference on soft magnetic materials; Eger, Hungary (6 Sep 1983).

31178 (INIS-mf—8962, pp A3) **Calculation of the crystal field parameters of the U^{4+} ion in UCl_4.** Zolnierek, Z.; Gajek, Z. 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31179 (INIS-mf—8962, pp J1) **Infrared and Raman studies of phonons and electrons in Th_3P_4 and Th_3As_4.** Schoenes, J.; Moerke, I.; Kueng, M. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik); Henkie, Z. (5258200PL). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31180 (INIS-mf—8962, pp J2) **5f-electrons in uranium laves-phase compounds. Photoemission from UMn_2, UFe_2, UCo_2, UFeNi, UOs_2 and UIr_2.** Brunner, J.; Erbudak, M.; Hullinger, F. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31181 (INIS-mf—8962, pp B4) **Composition-dependent magnetic properties of NpCosub(2+-x) laves-phase compounds. Moessbauer and X-ray diffraction studies.** Gal, J. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev; Ben-Gurion Univ. of the Negev, Beersheba (Israel)); Kuznietz, M.; Fredo, S. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev); Plotzel, W.; Asch, L.; Kalvius, G.M. (Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet fuer Physik). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31182 (INIS-mf—8962, pp C3) **Magnetic properties of N/sub p/M_4Al_3 intermetallic compounds (M = Cr, Cu) studied by Moessbauer effect magnetic susceptibility and neutron diffraction.** Gal, J.; Shaked, H. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev; Ben-Gurion Univ. of the Negev, Beersheba (Israel)); Kuznietz, M.; Fredo, S.; Melamud, M.; Pinto, H. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev); Potzel, W.; Kalvius, G.M. (Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet fuer Physik). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31183 (INIS-mf—8962, pp G3) **X-ray diffraction study of $NpAl_2$ at high pressure.** Zaenkert, J.; Potzel, W.; Moser, J.; Wunsch, M.; Obenhuber, T.; Kalvius, G.M. (Technische Hochschule Munich (Germany, F.R.). Physik-Dept.); Gal, J. (Ben-Gurion Univ. of the Negev, Beersheba (Israel); Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31184 (INIS-mf—8962, pp H7) **New tetragonal and hexagonal tungsten bronze type phases with actinides ions.** Launay, S.; Lee, M.R.; Freundlich, W. (Paris-6 Univ., 75 (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31185 (INIS-mf—8962, pp J5) **Transport properties of USb and UAs single crystals.** Schoenes, J.; Frick, B.; Vogt, O. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31186 (INIS-mf—8962, pp J6) **Transport properties of the p-type Th_3As_4.** Markowski, P.J.; Henkie, Z. 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31187 (INIS-mf—8962, pp H14) **Optical and thermodynamic properties of uranium at elevated temperature.** Mack, J.M.; Radziemski, L.J. (Los Alamos National Lab., NM (USA)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31188 (INIS-mf—8962, pp H8) **Diffusion couple studies in the U-Ga and Th-Ga systems.** Dayan, D.; Kimmel, G.; Dariel, M.P. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31189 (INIS-mf—8962, pp B2) **Magnetic properties of PuAs, PuSb and PuBi single crystals.** Spirlet, J.C.; Rebizant, J. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements); Vogt, O. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31190 (INIS-mf—8962, pp B3) **Valence transition of uranium in (U,Y)Sb.** Frick, B.; Schoenes, J.; Hulliger, F.; Vogt, O. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31191 (INIS-SU—197, pp 23-25) **Interaction of helium interstitial with vacancy.** Zhetbaeva, M.P.; Kirsanov, V.V.; Okhrimenko, N.S. (AN Kazakhskoj SSR, Alma-Ata. Inst. Yadernoj Fiziki). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780108.

In Radiation damage physics and radiation technology.

Reactions of interstitial helium with vacancies are studied using the method of dynamical simulation by means of computer. Dimensions and form of vacancy and helium annihilation zone are determined. It is essentially anisotropic. Vacancies located in one of the 14 nodes around helium annihilate with interstitial helium. After that helium transfers in substitution position. The reaction proceeds in two ways. Helium transfers directly after one shear into vacancies located in the nearest nodes. Helium does not get in vacancies located in distant nodes. It substitutes one of the neighbouring atoms and the latter gets to the vacant node.

31192 (INIS-SU—203, pp 32-35) **Phase transitions induced by bombardment of molybdenum and niobium with carbon nitrogen ions.** Gverdtsiteli, I.G.; Guldamashvili, A.I.; Diasamidze, Eh.M.; Kalinin, A.N.; Kutsiya, N.M.; Kuteliya, R.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Sukhumi. Fiziko-Tekhnicheskij Inst.). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780155.

In Radiation damage physics and radiation technology.

The composition and structural transformations in deposited Mo and Nb films during bombardment with carbon and nitrogen ions at liquid nitrogen temperature, 23 and 300 deg C, have been studied by transmission electron diffraction and proton backscattering techniques. It is found that ion implantation at fluences of $1x10^{17}$-$1x10^{18}$ cm^{-2} leads to the synthesis of carbides and nitrides. The N^+ ion bombardment at a liquid nitrogen temperature forms the heterogeneous system of oxides, nitrides and carbides.

31193 (INIS-SU—203, pp 40-42) **Radiation blistering and hydrogen permeability of titanium nitride coating produced on titanium by ion implantation.** Vinogradova, N.K.; Guseva, M.I.; Gordeeva, G.V.; Ivanov, S.M.; Mansurova, A.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780155.

In Radiation damage physics and radiation technology.

Titanium nitride coating produced on α-titanium by the ion implantation technique has been investigated. The radiography examination has shown that the produced coating consists of two phases, viz., TiN and Ti_2N. The coating shows no blistering, when irradiated with 40 keV helium ions at Tsub(irr)=300 deg C

($D=2x10^{18}$ cm^{-2}). The presence of this coating on titanium reduced the hydrogen permeability of the latter by a factor of about 7, this favourably distinguishes the ion-implanted coating from the titanium nitride coating obtained by sputtering technique. Besides the mentioned properties, the titanium nitride coating has a small Z value and a high melting temperature, thereby seeming to be an efficient coating of the first wall of a fusion reactor.

31194 (INIS-SU—203, pp 36-39) **Neutron irradiation effects on tungsten and molybdenum optical properties and possible application of optical measurements for studies of radiation-induced defects in metals.** Gromov, L.A.; Kizhnerov, L.V.; Sidorin, K.K. (Leningradskij Tekhnologicheskij Inst. (USSR)). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780155.

In Radiation damage physics and radiation technology.

The effect of neutron irradiation on the optical properties of tungsten and molybdenum has been studied. The neutron irradiation is shown to shift the maximum of the reflection spectrum towards short wavelenqths. As the radiation dose increases, the intensity of the reflected radiation decreases and the raximum of the spectrum shifts towards hiqher energies. The interpretation of the observed phenomenon is offered, it is shown that the d-state electrons appear to be most sensitive to the occurrence of radiation defects. The possibility of applying optical methods for studies of the nature and dynamics of radiation damages in metals is discussed.

31195 (INIS-SU—222, pp 79-80) **Thermostimulated relaxation processes in $Y_3Al_5O_{12}$ and α-Al_2O_3 crystals.** Krumin'sh, I.Ya.; Graver, V.E.; Zirap, V.Eh. (Latvijskij Gosudarstvennyj Univ., Riga. (USSR). Nauchno-Issledovatel'skij Inst. Fiziki Tverdogo Tela). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

31196 **(IS-M—465) Crack initiation model for stress corrosion cracking in α-brass.** Ranjan, R.; Buck, O. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 13p. (CONF-8310268—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012837.

From International symposium on concepts of fatigue crack growth threshold; Philadelphia, PA, USA (2 Oct 1983).

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A crack-tip opening displacement model which takes into account the development of corrosion pits and the initiation of microcracks as a function of applied stress and electropotential has been formulated for α-brass in non-tarnishing ammoniacal solution. In this model, designed for K $\leqq$ Ksub ISCC/, it is assumed that corrosion pits form and grow during the early stages of stress corrosion cracking. Once a critical corrosion pit depth is achieved, the strain energy release rate is large enough to initiate a microcrack. The predictions of this model in terms of the time to microcrack initiation (incubation time) are found to be in good agreement with all the experimental results obtained so far. Metallographic observations and scanning electron microscopy provided additional information on the transition from pitting to microcıack initiation. It was found that the critical pit dimensions for microcrack initiation are 5 to 10 μm deep (depending on stress). The calculated K/sub ISCC/ is consistent with that for macrocrack propagation.

31197 **(IS-M—474) Ductile-brittle transition temperature measurement of temper embrittled Ni-Cr steels by means of small punch tests.** Baik, J.M.; Kameda, J.; Buck, O. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 31p. (CONF-8309170—7). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012833.

From Symposium on the use of nonstandard subsized specimens for irradiated testing; Albuquerque, NM, USA (23 Sep 1983).

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The ductile-brittle transition temperatures of Ni-Cr steels having various degrees of intergranular embrittlement and various microstructures were determined by means of small punch tests. The measured values were compared with those obtained from Charpy impact and uniaxial tensile tests. The effects of punch tip shape, notch, and strain rate on the ductile-brittle transition behaviors were examined. It was found that the combined use of a notch, high strain rates and a small punch tip strongly affects the ductile-brittle transition behavior. Considerable variations of the data were observed when the small punch tests were performed on coarse-grained steels. Several factors controlling embrittlement measurements of steels are discussed in terms of brittle fracture mechanisms.

31198 **(JINR—14-83-444) Evoluation of radiation damage structure in molybdenum alloyed with neon atoms during post-irradiation annealing.** Reutov, V.F.; Vagin, S.P.; Vorob'ev, E.D.; Shchegolev, V.A.; Akap'ev, G.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1983. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701837.

The evolution of radiation damage structure induced by Ne ions has been studied by transmission electron microscopy during post-irradiation annealing. It is shown that the high temperature stability of the radiation damages is associated with neon gas bubble formation. The change in dislocation structure during the post-irradiation annealing is connected with the rate of defect formation and gas atom capturing rates.

31199 **(LA-UR—84-877) Microstructural stability of copper electroplate.** Hogan, B.M.; Roth, J.A. (Los Alamos National Lab., NM (USA); TRW, Inc., Redondo Beach, CA (USA)). 1984. Contract W-7405-ENG-36. 16p. (CONF-840711—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84010070.

From American Electroplaters' Society SUR/FIN '84 conference; New York, NY, USA (1 Jul 1984).

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Microstructural stability of metals used for high quality optics is necessary to maintain the low light scatter properties of the optical surface. Room temperature recrystallization of metal causes a roughening of the single-point-diamond-turned (SPDT) surfaces and increases the light scatter. Differential scanning calorimetry, microstructure analysis, x-ray diffraction micro-hardness, and mechanical properties data indicates that high internal stresses in the electroplating cause the low temperature recrystallization. Electroplating conditions causing the high stresses and methods of reducing the stresses after plating are discussed.

31200 **(LA-UR—84-1621) High-strain-rate measurements of dislocation mobility.** Follansbee, P.S.; Regazzoni, G.; Kocks, U.F. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 18p. (CONF-8308172—1). NTIS, PC A02; 3; GPO Dep. Order Number DE84012448.

From International symposium on mechanics of dislocations; Houghton, MI, USA (28 Aug 1983).

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The strain rate sensitivity in a variety of metals is known to increase dramatically when the strain rate exceeds about 10^3 s^{-1}. In copper, this behavior is analyzed in terms of the transition in rate controlling deformation mechanism from thermal activation to dislocation drag. Experimental results can be made to agree with a model of this transition, which leads to several observations regarding dislocation mobility at these high strain rates. The mobile dislocation density is estimated to be a mildly increasing function of stress or strain rate at any one strain and is roughly independent of strain for $0.05 \leqq \epsilon \leqq 0.20$.

31201 **(OH—82-450-K) Absorption of dissolved hydrogen from lithiated water during accelerated corrosion of zirconium-2.5 wt% niobium alloy.** Manolescu, A.V.; Mayer, P.; Rasile, E.M.; Mummenhoff, J.W. (Ontario Hydro Research Lab., Toronto (Canada)). 15 Nov 1982. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701836.

A series of laboratory experiments was carried out to determine the extent of dissolved hydrogen absorption from lithiated water by zirconium-2.5 wt% niobium alloy during corrosion. The material was exposed at 340° C to 1 M LiOH aqueous solution con-

taining 0 to approximately 70 cm^3/L of dissolved hydrogen. Results indicate that dissolved hydrogen has no effect on the corrosion rate or on the amount of hydrogen absorbed by the material.

31202 **(UCID—20098) EOS for Armco Iron at pressures less than 100 GPa.** Moss, W.C. (Lawrence Livermore National Lab., CA (USA)). 6 Jun 1984. Contract W-7405-ENG-48. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84013188.

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We have constructed an analytic EOS for Armco Iron, at pressures less than 100 GPa using shock data. The efects of the α reversible ϵ phase transition have been included.

31203 **(UCRL—89933) Engineering properties of some coatings.** Dini, J.W.; Cowden, W.C.; Kelley, W.K. (Lawrence Livermore National Lab., CA (USA)). 18 Oct 1983. Contract W-7405-ENG-48. 14p. (CONF-840711—1). NTIS, PC A02/MF A01. Order Number DE84002715.

From American Electroplaters' Society SUR/FIN '84 conference; New York, NY, USA (1 Jul 1984).

This paper reviews the contributions of H.J. Wiesner in advancing the state-of-the-art of electroplating. It will be presented as the Blum Lecture at AES SUR/FIN 84, July 1984 in New York.

31204 **Polarized-neutron reflections: A new technique used to measure the magnetic field penetration depth in superconducting niobium.** Felcher, G.P.; Kampwirth, R.T.; Gray, K.E.; Felici, R. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review Letters;* **52**: No. 17, 1539-1542(23 Apr 1984).

An absolute determination of the superconducting penetration length in niobium has been carried out by a novel technique, in which the reflectivity of a polarized-neutron beam from a polished surface is measured. The result thus obtained, $\Lambda(0) = 410 +- 40$ A, is in substantial agreement with the earlier work.

31205 **Magnetic ground state of a heavy-electron system: U_2Zn_{17}.** Ott, H.R.; Rudigier, H.; Delsing, P.; Fisk, Z. (Laboratorium fuer Festkoerperphysik, Eidgenoessische Technische Hochschule Hoenggerberg, CH-8093 Zuerich, Switzerland). *Physical Review Letters;* **52**: No. 17, 1551-1554(23 Apr 1984).

Measurements of the magnetic susceptibility, specific heat, and electrical resistivity of U_2Zn_{17} reveal a magnetic phase transition of this compound at 9.70 K. Details of the specific heat indicate that the ordering occurs among electrons whose energy spectrum shows an anomalously large density of states at the Fermi energy. This result is of interest with regard to the occurrence of superconductivity in similar systems.

31206 **Calculated low-field Hall coefficient of Ag/sub x/Pd/sub 1-x/ alloys.** Butler, W.H. (Metals and Ceramics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review [Section] B: Condensed Matter;* **29**: No. 8, 4224-4229(15 Apr 1984).

Alloy energy bands and electron lifetimes were calculated for Ag/sub x/Pd/sub 1-x/ alloys by using a charge self-consistent version of the Korringa-Kohn-Rostoker coherent-potential approximation. These results were used to calculate the low-field Hall coefficient as a function of concentration. The calculated Hall coefficients are in good agreement with experiment. Some commonly used approximations for the Hall coefficient are found to be inapplicable to Ag/sub x/Pd/sub 1-x/ alloys. In particular the Hall coefficient is not simply related to the number of carriers, nor is the Hall coefficient independent of the electron lifetime. Instead, the Hall coefficient is strongly enhanced by the anisotropy of the lifetime in the palladium-rich alloys. At higher temperatures the Hall coefficient of the palladium-rich alloys decreases because electron-phonon scattering makes the electron lifetime more isotropic.

31207 **Truncation-induced multilayer relaxation of the Al(110) surface.** Noonan, J.R.; Davis, H.L. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review [Section] B: Condensed Matter;* **29**: No. 8, 4349-4355(15 Apr 1984). Contract W-7405-ENG-26.

Results from a low-energy electron diffraction (LEED) analysis of the Al(110) surface are presented and discussed. The results indicate that a multilayer relaxation exists in the Al(110) surface region such that the spacing between layers 1 and 2 has a relative change Δd_{12} of -8.5% from the bulk value, while $\Delta d_{23} = +5.5\%$, $\Delta d_{34} = +2.2\%$, and $\Delta d_{45} = +1.6\%$. When these results are compared with those from an independent LEED analysis, excellent agreement is found between results for Δd_{12} and Δd_{23}. However, a disagreement is found to exist between the results of the two analyses for Δd_{34}. When this disagreement is considered in relationship to predictions of a recent theory for the multilayer relaxation of metallic surfaces, the importance of future work to resolve this Δd_{34} discrepancy is apparent.

31208 **Far-infrared absorption by granular superconductors.** Fuchs, R. (Ames Laboratory, U.S. Department of Energy and Department of Physics, Iowa State University, Ames, Iowa 50011). *Physical Review [Section] B: Condensed Matter;* **29**: No. 7, 3868-3872(1 Apr 1984). Contract W-7405-ENG-82.

The far-infrared absorption spectrum of a granular superconductor consisting of Sn spheres in a KCl host is calculated using the longitudinal dielectric function in a nonlocal theory for the polarizability of a small sphere. The theory can explain the frequency dependence, but not the anomalously large magnitude of the observed absorption.

31209 **Anisotropic spin fluctuations in cubic $CeSn_3$.** Tsang, T.E.; Gschneidner, K.A. Jr.; McMasters, O.D.; Stierman, R.J.; Dhar, S.K. (Ames Laboratory and Department of Materials Science and Engineering, Iowa State University, Ames, Iowa 50011). *Physical Review [Section] B: Condensed Matter;* **29**: No. 7, 4185-4188(1 Apr 1984).

The low-temperature high-field heat capacity of a $CeSn_3$ single crystal was found to develop an anisotropy for $H>2.50$ T with the magnetic field parallel to the [100] and [110] directions. The magnetic susceptibility of $CeSn_3$ below 5 K was also anisotropic with $chi_{110} > chi_{100}$ by ~5% at 1.8 K. For the first time ever an anisotropic quenching of spin fluctuations in any highly enhanced paramagnet has been observed.

31210 **Grueneisen parameter of cesium and rubidium at high pressure and the nature of the isostructural electronic transition.** Boehler, R.P.H.; Ross, M. (Institute of Geophysics and Planetary Physics, University of California, Los Angeles, California 90024). *Physical Review [Section] B: Condensed Matter;* **29**: No. 6, 3673-3676(15 Mar 1984). Contract W-7405-ENG-48.

The Grueneisen parameter (γ) for cesium has been measured in the solid to 43 kbar at 22 °C and in the liquid to 20 kbar at 200 °C. This parameter decreases in value with increasing pressure and demonstrates a dramatic decrease prior to the isostructural electronic transition at 42 kbar. After the transition, γ increases. γ for liquid Cs to 20 kbar is essentially the same as that for the solid. These results support the suggestion of Gloetzel and McMahan that an anomaly in the lattice vibrations is responsible for this transition. For Rb, γ approaches an asymptotic value of 0.5 at 35 kbar. The melting temperatures of these substances have been reinvestigated to 30 kbar.

31211 **Spin correlations and reentrant spin-glass behavior in amorphous Fe-Mn alloys. II. Dynamics.** Aeppli, G.; Shapiro, S.M.; Birgeneau, R.J.; Chen, H.S. (Brookhaven National Laboratory, Upton, New York 11973 and AT & T Bell Laboratories, Murray Hill, New Jersey 07974). *Physical Review [Section] B: Condensed Matter;* **29**: No. 5, 2589-2605(1 Mar 1984).

Inelastic-neutron-scattering measurements have been performed on amorphous $(Fe/sub\ 1-x/Mn/sub\ x/)_{75}P_{16}B_6Al_3$ alloys for

several concentrations x bracketing the spin-glass—ferromagnetic multicritical point found from magnetization measurements. For x = 0.35, the alloy is nonferromagnetic, and the inelastic spectra are dominated at all temperatures by a resolution-limited quasielastic peak. We find no evidence for propagating modes of any kind. In a 10-kG applied field, the central peak is substantially reduced, and dispersionless sidebands, centered at the Larmor precession frequency, appear. Three samples (x = 0.30, 0.25, and 0.20) on the ferromagnetic side of the phase diagram have also been studied. Spectra were collected for one of these (x = 0.25) above its Curie point. These data are consistent with ordinary spin diffusion. For all three samples, resolvable spin-wave peaks exist at temperatures below the Curie points but above the spin-glass transitions established in bulk measurements. As the temperature is reduced, the spin-wave stiffness first increases, as in normal ferromagnets, and then decreases. At the lowest temperatures, resolvable spin-wave peaks are absent, and the spectra are dominated by a resolution-limited (<30 μeV full width at half maximum) quasielastic peak. For the most iron-rich material (x = 0.20), true inelastic scattering coexists with the central peak, even at 5 K. This inelastic scattering broadens and decreases in intensity with increasing momentum transfer Q, in a manner consistent with simple spin-wave theory. The central-peak intensity decays according to a power law Q/sup -alpha/, with $\alpha >$ or ≈ 2.

31212 **Determination of the minimum surface enrichment of molybdenum required to inhibit active dissolution of an Fe-Cr-Ni-Mo alloy.** Newman, R.C.; Franz, E.M. (Brookhaven National Laboratory, Materials Technology Division, Upton, New York). *Journal of the Electrochemical Society;* **131**: No. 1, 223-224(Jan 1984).

It is becoming clear that molybdenum inhibits localized corrosion of stainless steels through its effect on the anodic dissolution kinetics, rather than by any mechanism which could be discovered by analyzing the fully developed passive film. Wanklyn has emphasized the importance of MoO_2 as a compound which is readily formed and is stable at relatively active potentials in mildly acidic solutions. It is also kinetically stable in strongly acidic solutions because of the necessity for reductive dissolution as Mo^{3+}. In the passive state at much higher potentials there is a tendency for depletion of Mo in the passive film.

31213 **The high-temperature strength of commercial-purity alpha uranium.** Logan, R.W. (Lawrence Livermore National Laboratory, Livermore, CA). *Metallurgical Transactions, [Section] A: Physical Metallurgy and Materials Science;* **14A**: No. 11, 2337-2346(Nov 1983). Contract W-7405-ENG-48.

The effects of adding less than 500 ppM of aluminum, iron, and silicon on the high-temperature properties of alpha uranium are characterized. Adding aluminum or adding iron and silicon increased the flow stress in all cases and also increased the activation energy if a fine dispersion of second-phase particles was retained. On solution treating the additives in the beta region and retesting the alpha phase, the flow stress increased by about 50 pct--a result of much larger alpha-phase grain size and dispersion-hardening effects. Strong crystallographic textures developed by rolling did not significantly affect flow stress.

31214 **Corrosion in atmospheric fluidized bed combustors--the reactions of $CaSO_4$ with Cr, Ni, Co, Fe, and several alloys.** Ficalora, P.J. (Oak Ridge National Laboratory, Oak Ridge, TN). *Metallurgical Transactions, [Section] A: Physical Metallurgy and Materials Science;* **14A**: No. 11, 2423-2434(Nov 1983). Contract W-7405-ENG-26.

When coal is burned in the presence of limestone in an atmospheric fluidized-bed combustor (AFBC), the sulfur emission can be kept below acceptable EPA levels. Calcining of the limestone produces CaO, which then forms solid $CaSO_4$ by a reaction with the SO_2 produced during coal combustion. The internal components (e.g., heat exchanger tubes) of the bed, however, become coated with a compact layer of $CaSO_4$, CaO, and ash during combustion. It has been suggested that the presence of the sulfate on these hot metal surfaces is the cause of observed instances of accelerated oxidation-sulfidation. This paper presents results which support the above suggestion. The reactions between Cr, Ni, Co, Fe, alloy 800, 2.25 Cr-1 Mo, 9 Cr-1 Mo steels, or 304 stainless steel with $CaSO_4$ were studied using differential thermal and thermogravimetric analyses. The reaction products were analyzed using X-ray diffraction, optical microscopy, and in some instances, X-ray energy dispersive analyses. The chromium-calcium sulfate reaction is the only case studied in which a sulfide is not formed. In that case, $CaCr_2O_4$ is the reaction product. In all other cases, the reactions are oxidation-sulfidation processes.

31215 **Ion-beam profiling of ^3He in tritium-exposed type 304L and type 21-6-9 stainless steels.** Meyers, S.M.; Caskey, G.R.; Rawl, D.E.; Sisson, R.D. (Sandia National Laboratories, Albuquerque, NM). *Metallurgical Transactions, [Section] A: Physical Metallurgy and Materials Science;* **14A**: No. 11, 2261-2268(Nov 1983). Contract AC04-76DP00789;AC09-76SR00001.

The nuclear reaction ^3He (d,p) ^4He was used to determine ^3He depth profiles in high-energy-rateforged Type 304L and Type 21-6-9 stainless steels following exposure to tritium. A sensitivity to ^3He better than 1 atomic ppm and a depth resolution of about 0.5 μm were achieved. The ^3He decay product provides an essentially immobile trace of the diffusing tritium, and as a result tritium diffusivity and solubility may be calculated from the measured ^3He distribution. Tritium exposure in these experiments occurred at 343 K under 45 MPa partial pressure. The diffusion coefficient obtained at 343 K was (1.6 + or - 0.3) X 10^{-9} mm^2 per second in both steels, while the solubility at 45 MPa partial pressure was 3700 + or - 900 atomic ppm for Type 304L and 7500 + or - 1900 atomic ppm for Type 21-6-9.

31216 **Effects of magnetic fields on martensite transformations and mechanical properties of steels at low temperatures.** Fultz, B.; Chang, G.M.; Morris, J.W. Jr. (Materials and Molecular Research Division, Lawrence Berkeley Lab. and Dept. of Materials Science and Mineral Eng., Univ. of California, Berkeley, CA 94720). pp 199-210 of Austenitic steels at low temperatures. Reed, R.P.; Horiuchi, T. New York, NY; Plenum Publishing Corp. (1983). (CONF-820546—). Contract AC03-76SF00098.

From 9. international cryogenic engineering conference; Kobe, Japan (10 May 1982).

This paper reviews the combined effects of magnetic fields and mechanical loading on the martensite transformation of austenitic stainless steels used for the magnet structure in superconducting magnets. Both athermal and isothermal transformations are tested for the effects of magnetic fields. The four situations in which the presence of a magnetic field in addition to mechanical loading influence the mechanical properties of cryogenic structural alloys are listed, though none have been studied in detail. Two initial experiments with a pulsed magnetic field, testing the effect of magnetic fields on the toughness of overtempered 9Ni cryogenic steel, and 304 stainless steels are described. The straining fixture, and subsequent x-ray and optical metallographic analysis of the latter are shown. Finally, a new testing facility which has been established to measure cryogenic mechanical properties in steady 8T magnetic fields, the LBL Magneto-Mechanical Cryogenic Research (MMCR) facility, is described.

31217 **The effect of delta-ferrite upon the low temperature mechanical properties of centrifugally cast stainless steels.** Lee, K.S.; Dew-Hughes, D. (Dept. of Nuclear Energy Brookhaven National Lab.). pp 221-242 of Austenitic steels at low temperatures. Reed, R.P.; Horiuchi, T. New York, NY; Plenum Publishing Corp. (1983). (CONF-820546—).

From 9. international cryogenic engineering conference; Kobe, Japan (10 May 1982).

The use of centrifugally cast stainless steel tubes for ISABELLE at Brookhaven Laboratory provided an opportunity to study the influence of delta-ferrite content upon the properties of a series of cast stainless tubes. Tensile properties and impact strengths are measured and then related to the composition and the deltaferrite content of the steel. The compositions of the materials are specified in detail. The microstructure and ferrite forms, such as primary dendrites, are studied. Various results of tensile and impact tests are plotted versus ferrite contents, Instances of martensite

transformation of the ISABELLE magnet tube are also investigated.

31218 **The mechanical properties of stainless steel castings at 4 K.** Whipple, T.A.; McHenry, H.I. (Fracture and Deformation Division National Bureau of Standards Boulder, CO). pp 243-248 of Austenitic steels at low temperatures. Reed, R.P.; Horiuchi, T. New York, NY; Plenum Publishing Corp. (1983). (CONF-820546—).

From 9. international cryogenic engineering conference; Kobe, Japan (10 May 1982).

The limited use of stainless steel castings for 4 K service is due to the limited data available on their mechanical properties at 4 K. This study evaluates the effects of delta-ferrite and nitrogen on the 4 K tensile and fracture toughness properties of a series of nine CF8M stainless steel castings. It is found that an increase in either the delta-ferrite or nitrogen content of CF8M steel castings increases the yield strength and reduces the ductility. Increasing the deltaferrite content also decreases the fracture toughness up to 4 K, after which it stabilizes. Finally, increasing the nitrogen content above 0.10 percent reduces the fracture toughness.

31219 **Positron prevacancy effects in pure annealed metals.** Smedskjaer, L.C. (Argonne National Lab., IL (USA). Materials Science Div.). pp 597-608 of Positron solid-state physics. Proceedings. Brandt, W.; Dupasquier, A. (eds.). Amsterdam, Netherlands; North-Holland Publ. Co. (1983). (CONF-810756—).

From International School of Physics course on positrons in solids; Lake Como, Italy (14 Jul 1981).

It has been shown that the prevacancy effects observed for positron annihilation in metals are due to positron trapping in defects. It has been suggested that these defects are dislocations, but other possibilities should also be considered in future work. One might at first consider the prevacancy effects as a complication, just as the discovery of positron trapping in defects was perceived originally. However, since these effects reflect the underlying metal physics, the prevacancy effects may indeed represent a new area of defect research.

3602 Ceramics, Cermets, And Refractories

REFER ALSO TO CITATION(S) 30291, 30304, 30305, 30307, 30311, 31193, 31614

31220 **(CONF-830573—11) Ion implantation, ion beam mixing, and annealing studies of metals in Al_2O_3, SiC and Si_3N_4.** Appleton, B.R.; Naramoto, H.; White, C.W.; Holland, O.W.; Mchargue, C.J.; Farlow, G.; Narayan, J.; Williams, J.M. (Oak Ridge National Lab., TN (USA)). 1983. Contract AC05-84OR21400. 11p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012336.

From 2. international conference on radiation effects in insulators; Albuquerque, NM, USA (30 May 1983).

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Ion scattering/channeling, TEM, EPR and optical microscopy are utilized to determine the structural modifications of ion implanted and annealed Al_2O_3, SiC, and Si_3N_4, and to correlate these modifications to surface mechanical property measurements. Ion beam mixing is also studied for inducing increased adherence of metal films on these insulators.

31221 **(CONF-840145—2) Point defects and diffusion mechanisms in the monoxides of the iron-group metals.** Peterson, N.L. (Argonne National Lab., IL (USA)). 1984. Contract W-31-109-ENG-38. 24p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012105.

From INDO-US workshop on diffusion in solids; Bombay, India (9 Jan 1984).

The properties of point defects and the mechanisms of cation diffusion in NiO, CoO, and FeO are reviewed. The method of analysis and the results are presented in some detail for NiO to demonstrate how results from measurements of electrical conductivity, deviation from stoichiometry, tracer diffusion, and chemical diffusion may be used to obtain concentrations and mobilities of defects. The results of similar analyses are presented for CoO and FeO; these results demonstrate the importance of defect clustering and defect-defect interactions at large defect concentrations. 12 figures.

31222 **(CONF-8404106—3) Neutron diffraction study on βY-β_2 transformation in Ta_2D.** Kaneko, H.; Kajitani, T.; Hirabayashi, M.; Niimura, N.; Schultz, A.J.; Leung, P. (Tohoku Univ., Sendai (Japan). Research Inst. for Iron, Steel and Other Metals; Tohoku Univ., Sendai (Japan). Lab. of Nuclear Science; Argonne National Lab., IL (USA)). 1984. Contract W-31-109-ENG-38. 3p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012109.

From International symposium on the properties and applications of metal hydrides; Eilat, Israel (9 Apr 1984).

The β_1-β_2 phase transformation in Ta_2D has been studied by single crystal neutron diffraction using the pulsed neutron sources in Tohoku University and Argonne National Laboratory. Simultaneous measurements of diffraction intensity on a certain plane (Tohoku) or several planes (IPNS) in the reciprocal lattice were made by the use of these apparatuses. The structural change of Ta_2D from the low temperature phase (β_1) to the high temperature phase (β_2) was elucidated in the temperature range of 20 to 55°C. Results are reported.

31223 **(CONF-8405176—1) Observations on the sliding wear of ceramics.** Yust, C.S.; Carignan, F.J. (Oak Ridge National Lab., TN (USA); Advanced Mechanical Technology, Inc., Newton, MA (USA)). 1984. Contract AC05-84OR21400. 23p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012344.

From American Society of Lubrication Engineers meeting; Chicago, IL, USA (1 May 1984).

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Modern design concepts for heat engines with increased thermal efficiency call for the utilization of ceramic components. In some applications, lubrication of these components will be difficult to maintain. Consequently, a need exists for an expanded understanding of the dry sliding wear behavior of ceramics. Sliding wear experiments were performed on several ceramic pairs (ZrO_2, Al_2O_3, Si_3N_4, SiC) from which wear rate data and information on the nature of the physical damage resulting from dry sliding were obtained. The wear evaluation was a pin-on-disc test. The test conditions included temperatures as high as 425°C, a surface velocity of 0.3 m/s, and a normal force of 9.0 N. Most of the specimens experienced moderate to severe damage. Damage characterized as mild wear was observed in a single room temperature test. The coefficient of friction for the damaged specimens ranged from 0.7 to 1.0, while this value was consistently 0.24 for the undamaged specimen. The implications of these results for wear mechanisms are discussed.

31224 **(DOE/ER/10619—T1) Effect of crystallization of grain boundary phase on the high temperature strength of silicon nitride ceramics. Final report, April 1, 1980-March 31, 1984.** Tien, T.Y. (Michigan Univ., Ann Arbor (USA). Dept. of Materials and Metallurgical Engineering). 1984. Contract AC02-80ER10619. 99p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84011786.

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Grain growth kinetics of SIALON grains during hot pressing were studied. Microchemical analysis work has also been carried out. The decrease of K/sub IC/ value with and increasing amount of YAG in the annealed specimens in the system SIALON-YAG can be attributed to the higher thermal expansion coefficient of the YAG than that of the SIALON crystals. The YAG crystals at the grain boundaries which crystallized at high temperatures during annealing contracted more than the SIALON grains during cooling and tension were generated at the interfaces. Cordierite has a lower thermal expansion coefficient than that of the SIALON crystals. The system SIALON-cordierite was then studied. It was found that the toughness of the ceramics in the system SIALON-cordierite increased upon annealing treatments. Bulk glasses in the system SIALON-cordierite were also prepared. The glass formation and crystallization behavior in this system were studied. The results of the above studies are reported in the following sections: the microchemical analysis of the grain and grain boundary phases in the system SIALON-YAG; grain growth kinetics of β grains in the

system SIALON-YAG; high temperature mechanical property measurements; the system SIALON-cordierite; and glass formation in the system SIALON-cordierite.

31225 (INIS-BR—107, pp 13) **^{57}Fe Moessbauer investigation of the ternary hydride Pd_3FeH sub(x).** Correa, M.H.P.; Vasquez, A.; Costa Junior, M.I. da; Viccaro, P.J. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Silva, C.E.T.G. da (Universidade Estadual de Campinas (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31226 (INIS-BR—107, pp 15-16) **Identification of iron oxides in the clay fraction of Dusky red latosol.** Pombo, L.C.A.; Klamt, E.; Kunrath, J.I.; Gianluppi, D. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31227 (INIS-mf—8962, pp C2) **Neutron diffraction study of the magnetic ordering in plutonium monopnictides PuAs PuSb.** Burlet, P.; Quezel, S.; Rossat-Mignod, J. (CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France). Lab. de Diffraction Neutronique); Vogt, O. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik); Spirlet, J.C.; Rebizant, J. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31228 (INIS-mf—8962, pp G2) **High pressure x-ray diffraction study of actinide compounds. Thorium dioxide and thorium monosulfide.** Benedict, U.; Dufour, C.; Spirlet, J.C. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements); Staun Olsen, J. (Copenhagen Univ. (Denmark). H.C. Oersted Inst.); Gerward, L. (Danmarks Tekniske Hoejskole, Lyngby). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31229 (INIS-mf—8962, pp H2) **Neutron diffraction study of Usub(0.5)Npsub(0.5)O_2.** Tabuteau, A.; Pages, M. (Institut Curie, Section de Physique et Chimie - ERA CNRS, Paris (France)); Caciuffo, R. (Commission of the European Communities, Ispra (Italy). Joint Research Centre; Institut Max von Laue - Paul Langevin, 38 - Grenoble (France)); Manes, L.; Rebizant, J. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31230 (INIS-mf—8962, pp H3) **EPR studies of U^{4+} doped ThO_2 single crystals.** Giori, D.C. (Parma Univ. (Italy). Ist. di Fisica; GNSM/CNR-Parma (Italy)); Calestani, G. (Parma Univ. (Italy); CSD/CNR-Parma (Italy)); Amoretti, G. (CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31231 (INIS-mf—8962, pp F3) **Morphology of the reaction of uranium with hydrogen.** Bloch, J.; Simca, F.; Kroupp, M.; Stern, A.; Shmarjahu, D.; Hadari, Z.; Mintz, M.H. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31232 (SAND—83-1949C) **Lead zirconate-lead titanate (PZT) ceramics from organic-derived precursors.** Dosch, R.G. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 7p. (CONF-840288—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84009921.

From Symposium on better ceramics through chemistry; Albuquerque, NM, USA (27 Feb 1984).

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Organic-derived precursors can facilitate the preparation of PZT ceramics, particularly in the areas of processing and batch reproducibility. The use of partially alkoxide-derived precursors and completely organic-derived precursors has been studied. Two methods of alkoxide hydrolysis were evaluated for preparing zirconia which included direct hydrolysis in water and hydrolysis of alkoxide-base reaction products in acetone-H_2O mixtures. The chemistry of these methods is discussed along with pertinent aqueous surface chemistry of the hydrated zirconia products. This work suggests that alkoxide-derived precursor properties are related to the solution chemistry used in their preparation.

31233 (UFRJ-IF—10/82) **Fe^{3+} octahedral-site properties in ordered $LiAl_5O_8$.** Abritta, T.; Maria Neto, J.; Souza Barros, F. de; Melamed, N.T. (Rio de Janeiro Univ. (Brazil). Inst. de Fisica). 1982. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701781.

The identification of Fe^{3+} in B-sites of $LiAl_5O_8$ in its ordered phase is established by optical measurements for very low concentrations of the impurity. X-ray and infrared data reveal that some of the crystaline inhomogeneities of this system may be related to impurity effects due to Fe^{3+}.

31234 **Conduction mechanism in boron carbide.** Wood, C.; Emin, D. (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California 91109). *Physical Review* [*Section*] *B: Condensed Matter;* **29**: No. 8, 4582-4587(15 Apr 1984).

Electrical conductivity, Seebeck-coefficient, and Hall-effect measurements have been made on single-phase boron carbides, B/sub 1-x/C/sub x/, in the compositional range 0.1< or =x< or =0.2 between room temperature and 1273 K. The results indicate that the predominant conduction mechanism is small-polaron hopping between carbon atoms at geometrically inequivalent sites.

31235 (ORNL-tr—5117) **Comparative studies of vapor and liquid-phase impregnation of porous silicon nitride and silicon carbide materials.** Strohmeier, H. (Oak Ridge National Lab., TN (USA); Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemie). 1984. Contract AC05-84OR21400. Translation of Dissertation from the Faculty of Chemistry of the University of Karlsruhe, Oct. 1981. 159p. NTIS, PC A08/MF A01; 1; GPO Dep. Order Number DE84012867.

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Purpose was to produce dense Si_3N_4 and SiC bodies without using foreign additives, in order to avoid their negative effect on creep above 1000°C. Although stress-free bodies can be produced by reaction sintering (RB = reaction bonding), they are highly porous and post-densification must be achieved by impregnation. RB Si_3N_4 was impregnated with polysilanes and then subjected to pressure pyrolysis. Densification by CVD was also investigated. It is concluded that the goals of densification, solidification, reduction of creep rate and improvement of oxidation resistance, have been attained. 85 figures, 11 tables. (DLC)

31236 **(LA-tr—81-12) Effect of electron irradiation on monocrystalline yttrium oxide (Y_2O_3).** Gaboriaud, R.J.; Denanot, M.R. Translated from *Radiation Effects ;* No. 4, 203-210(1981). Contract W-7405-ENG-36. 19p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE81030651. DE81030651

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Electron microscopy investigation in Yttrium oxide, Y_2O_3, with 100 and 700 keV electrons at 293 K, shows irradiation effects. This phenomenon acts essentially as a decoration of edge dislocations by planar defects probably in the prolongation of their extra half planes. The observations are interpreted in terms of dislocation loop nucleation. The velocity of such phenomena might be due to molecular oxygen precipitation. Such an irradiation phenomenon appears as the amplifier of dislocation climb process.

3603 Composite Materials

REFER ALSO TO CITATION(S) 31052

31237 **(CONF-840403—6) Negative ion formation in SF_6 spark by-products.** Sauers, I.; Christophorou, L.G.; Spyrou, S.M. (Oak Ridge National Lab., TN (USA); Tennessee Univ., Knoxville (USA)). 1984. Contract AC05-84OR21400. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012340.

From 4. international symposium on gaseous dielectrics; Knoxville, TN, USA (29 Apr 1984).

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When sulfur hexafluoride (SF_6) gas is used as electrical insulation (e.g., in high voltage or switching applications), deterioration of the gas caused by sparks, corona, high electrical stress, or high temperature results in a buildup of by-products whose electron attaching properties differ from those of SF_6. We have identified a number of long-lived by-products formed by spark discharges in SF_6 at pressures in the range 40 to 233 kPa and measured quantitatively the concentrations of the by-products SOF_2, SO_2F_2, SO_2, SiF_4, and SOF_4. These by-products are formed via the interaction of the multiplicity of transient short-lived species in sparked SF_6 with moisture, electrode material, and insulators. Each has been studied individually in a time-of-flight mass spectrometer, and the negative ion yields as a function of electron energy in the range 0 to 12 eV have been measured and are reported. The negative ions and their peak energy positions (shown in parentheses in eV) are: F^- (0.6), SOF_2^-* (~ 0) for SOF_2; F^- (3.45), F_2^- (3.3), SO_2F^- (2.95), $SO_2F_2^-$* (~ 0) for SO_2F_2; O^- (4.55), S^- (4.0), SO^- (4.8) for SO_2; F^- (11.25), SiF_3^- (11.1) for SiF_4; and F^- (3.3), SOF_3^- (~ 0) for SOF_4 [the asterisk (*) indicates that the ion is long lived (lifetime $>10^{-6}$ s) with respect to autodetachment]. Cross sections for electron attachment to SO_2 are reported and compared with literature data.

31238 **(CONF-840440—1) Improvements in mechanical properties in SiC by the addition of TiC particles.** Wei, G.C.; Becher, P.F. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 21p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012352.

From 86. annual meeting and exposition of the American Ceramic Society; Pittsburgh, PA, USA (29 Apr 1984).

Silicon carbide ceramics containing up to 24.6 vol % of dispersed TiC particles yielded fully dense composites by hot pressing at 2000°C with 1% Al and 1% C added. The microstructure consists of fine TiC particles in a fine-grained SiC matrix. Addition of TiC particles increases the critical fracture toughness of SiC (to ~ 6 MPa m/sup 1/2/ at 24.6 vol % TiC) and yields high flexure strength (≧ 680 MPa), with both properties increasing with increasing volume fraction of TiC. The strengths at elevated temperatures are also improved by the TiC additions. Observations of the fracture path indicate that the improved toughness and strength are a result of crack deflection by the TiC particles.

31239 **(SAND—83-2573) Liquid metal infiltration of an aluminum alloy into a packed column of B_4C particles.** Hosking, F.M.; Netz, A.A. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 28p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012136.

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The infiltration length of an Almag 35 alloy (6 to 7% Mg, balance Al) into a packed bed of B_4C particles was investigated. The influence of particle size (3.0 to 9.0 mm), particle preheat (477 to 700°K), and metal pour temperature (1033 to 1144°K), and metal pour temperature (1033 to 1144°K) on metal infiltration was evaluated. Particle size and the interaction effects between particle size/particle preheat, particle size/pour temperature and particle preheat/pour temperature had a significant influence on metal penetration. A first approximation model for infiltration was developed. Maximum penetrations of approximately 119 mm were observed for a 9 mm/700°K preheat/1144°K pour parameter of the factor space.

3604 Polymers And Plastics

REFER ALSO TO CITATION(S) 30961, 31049, 31416

31240 **(AD—912948/7) Cationic polymerization of vinyl-substituted monomers with alpha, alpha, alpha', alpha' - tetraphenyl-p-xylyl biscarbonium hexachloroantimonate. Final technical report, Oct 70-Aug 71.** Hedberg, F.L. (Air Force Materials Lab., Wright-Patterson AFB, OH (USA)). Jun 1973. 20p. (AFML-TR—73-38). NTIS, PC A02/MF A01.

The hexachloroantimonate salt of the alpha, alpha, alpha', alpha'-tetraphenyl-p-xylyl biscarbonium ion has been investigated as an initiator of cationic polymerization of vinyl compounds. This biscarbonium ion salt was found to be ineffective for initiating polymerization of vinyl aliphatic compounds, but effective for initiating polymerization of vinyl ethers. The mechanism of vinyl ether polymerization with this initiator was studied by end-capping reactions. The initiator was found to be incorporated into the polymer indicating an addition mechanism, but no evidence of end-capping groups was found, indicating the absence of 'living' dicationic polymer chains.

31241 **(AD-A—136955/2) Polymerization of 3-methyl-2,5-dibromothiophene utilizing n-butyllithium and copper(II) chloride. Technical report.** Amer, A.; Zimmer, H.; Mulligan, K.J.; Mark, H.B. Jr.; Pons, S. (Utah Univ., Salt Lake City (USA). Dept. of Chemistry). 6 Jan 1984. 12p. (TR—20). NTIS, PC A02/MF A01.

In recent years, there have been extensive research activities focussed on macromolecules with extended pi-electron system. Among the many macromolecules studied, conjugated olefinic compounds (polyenes), have been given much attention. Various methods for their synthesis have been reported. In the heterocyclic category, there are four reports on the synthesis of poly(3-substituted-2,5-thienylene) (substituent = H, CH3) via coupling of 3-substituted-2,5-dibromothienylmagnesium by nickel salt promoters. Recently Afanas'ev, et al. reported also about the preparation of poly(2,5-thienylene) by an electrochemical method. The ability for charge transport through the thiophene polymer chain is an important criterion for achieving high conductivity. For that reason the synthesis of polyenes was studied. The present investigation was undertaken to improve the synthesis of poly(3-methyl-2,5-thienylene) and to obtain a magnesium free material. n-Butyl lithium was used as dehaloginating agent. Cu(II) chloride was utilized to serve as catalyst.

31242 **(AD-A—137089/9) Mechanism of Ziegler-Natta polymerization of acetylene: a nutation NRMR study. Technical report, 22 Jun 82-9 Dec 83.** Clarke, T.C.; Yannoni, C.S.; Katz, T.J. (Columbia Univ., New York (USA). Dept. of Chemistry). 9 Dec 1983. 14p. (TR—7). NTIS, PC A02/MF A01.

Using nutation NMR spectroscopy the distance between adjacent ^{13}C labels was measured in samples of polyacetylene prepared by polymerizing a dilute solution of double ^{13}C-labelled acet-

ylene in ^{13}C-acetylene using titanium tetra-n-butoxide plus triethylaluminum as a catalyst. The experiments accord with expectation if the polymerization proceeds by a four-center insertion mechanism rather than by a metallacycle mechanism involving metal-carbenes.

31243 (INIS-mf—8901, pp 150-156) **Ion irradiation induced modification of polymethyl methacrylate.** Mladenov, G.M. (Bulgarian Academy of Sciences, Sofia (Bulgaria). Institute of Electronics); Braun, M.; Emmoth, B. (Research Inst. of Physics, Stockholm (Sweden).). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

The mechanism which leads to the change of polymer solubility upon ion irradiation is the point of interest. The sensitivity of $C_5H_8O_2$ resist irradiated by H^+, He^+ and Ar^+ ions as a function of energy has been measured. A correlation is found between the critical dose and the stopping cross section of the irradiating ions in the resist.

31244 **Observation of gelation process in two dimensions.** Miyano, K.; Veyssie, M. (College de France, F-75231 Paris Cedex 05, France; Argonne National Laboratory, Argonne, Illinois 60439; and Research Institute of Electrical Communication, Tohoku University, Sendai-980, Japan). *Physical Review Letters;* **52**: No. 15, 1318-1320(9 Apr 1984).

The gelation process in a monolayer adsorbed at the oil/water interface has been monitored by measurement of the shear mechanical properties. A clear sol-gel transition has been observed for the first time in a two-dimensional system.

31245 **(LA-tr—84-14-Pt.1) Properties of polymers: some uses in electronics. Part One.** Carrega, M. (Los Alamos National Lab., NM (USA); Rhone-Poulenc, 92 - Paris (France)). 1984. Contract W-7405-ENG-36. Translated from Colloque International sur les Nouvelles Orientations des Composants Passifs: Materiaux, Technologies, Mise en Oeuvre, Paris, Communications, pp. 49-54, 1983. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012863.

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Thermomechanical behaviour of polymers are discussed: glass transition, rubbery behaviour, melting of semi-crystalline polymers. Relationship between the chemical structure and the thermomechanical behaviour is explored. The case of polypropylene is considered. Processing and thermal post-treatment effects, dimensional stability are discussed. Impact resistance and permeability are discussed.

31246 **(LA-tr—84-15-Pt.2) Properties of polymers: some uses in electronics. Part Two.** Dubois, J.C. (Los Alamos National Lab., NM (USA); Thomson-CSF, 91 - Orsay (France)). 1984. Contract W-7405-ENG-36. Translated from Colloque International sur les Nourvelles Orientations des Composants Passifs: Materiaux, Technologies, Mise en Oeuvre, Paris, Communications, pp. 55-62, 1983. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012864.

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This article deals with the electrical and dielectrical properties of polymers. This part describes the dielectric properties of polymers. The general properties are quoted. Some prospective applications to capacitors are then proposed. Conductive and semiconductive polymers are described. The use of plastic materials is considerably developed in electronics and electrical engineering for applications such as capacitors, cable wrapping, coating for components, various supports. Other less standard applications appear in the realm of optical communications, information storage, or manufacture of new components. In these applications the molecular structure and morphology play a significant role. This structure-property relationship will be discussed in the following realms with the assistance of some examples: dielectrics: new materials and applications to capacitors; semiconductors and conductors, intrinsic conductors (polyacetylene, polyphenylene), charged polymer conductors, potential applications.

31247 **(LA-tr—83-3) ^{13}C solid high-resolution NMR in polyacetylene and its derivatives.** Terao Takehiko; Shiro Maeda; Tokio Yamabe; Kazuo Akagi; Eiju Shirakawa; Sakuji Ikeda. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. Translated from Koen Yoshishu - Bunshi Kozo Sogo Toronkai, Kyoto, October 2-5, 1981, 4C07 pp 660-661 (Abstracts of Lectures). 5p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011730.

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Polyacetylene (CH)/sub x/ is the most basic compound of conjugated bond systems having a chainlike structure, and cis-type and trans-type isomers exist. These are semiconductors, and if an electron acceptor or donor are doped, electrical conductivity increases abruptly at a viscosity of 2 ~ 3 mole %, and metallic characteristics appear. We used the CP/MAS method, which is a combination of the proton-enhanced NMP method and the magic angle spin method (MAS), for these materials and measured the ^{13}C NMR spectrum. Results obtained are reported.

3606 Other Materials

REFER ALSO TO CITATION(S) 30336, 30509, 31317, 31632, 31633, 31956

31248 **(DOE/ER/04974—6) Interactions of molecules with surfaces. Progress report, February 1, 1983-January 31, 1984.** Greene, E.F. (Brown Univ., Providence, RI (USA)). Jan 1984. Contract AC02-78ER04974. 9p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012232.

Measurements of the rate of desorption of alkali atoms from the surfaces of Si crystals reveal surface phase transitions, a well-known one for the (111) face at 1020 +- 40°K and a previously unreported one for Si(100) at 980 +- 20°K. The kinetics of the desorption can be interpreted with a model that has a relatively smooth surface above the transition and a less uniform one below. The latter has special sites, such as edges, where the atoms are bound more strongly than they are at the terraces between the edges. Tetramethyldioxetane in excess hydrogen decomposes to two acetone molecules by impact on a surface. The reaction is followed by detecting blue light emitted by electronically excited acetone formed in the collision. The light increases approximately as the cube of the excess of the kinetic energy over a reaction threshold of 50 +- 10 kJ mol^{-1}. The amount of light varies with the nature of the surface and its temperature. On the eight surfaces tested it is largest for a polymer of perfluorinated ethylene and propylene. A simple model is proposed to account for the compensation effect that is observed when desorption occurs from surfaces that undergo a phase transition. Measurements are reported of the angular distribution of beams of He and Ar diffracted from crystals of LiF.

31249 (INIS-BR—107, pp 2) **Nuclear quadrupole interaction studies of high pressure phase transitions in InSb.** Gallas, M.R.; Fries, S.G.; Jornada, J.A.H. da; Livi, R.P.; Fraga, E.R.; Maciel, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31250 (INIS-BR—107, pp 5) **Kinetics of phase transform in carbon under high pressure.** Jornada, J.A.H. da; Oliveira, L.S. de (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31251 (INIS-BR—107, pp 9-10) **Hyperfine interactions in the ErFe$_5$ H sub(2.7) hydride.** Cunha, J.B.M. da; Vasquez, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31252 (INIS-BR—107, pp 15) **Perturbed angular correlation attenuation factor for relaxing systems.** Martinez, J.A. (CICPBA (Argentina)); Sanchez, F.H. (CONICET (Argentina)); Vasquez, A. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

31253 (INIS-mf—8921, pp 58) **Orientation of HNO_3 molecules in highly oriented pyrolytic graphite-nitrates and in the corresponding residue compounds.** Moreh, R.; Shahal, O.; Kimmel, G. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1983. NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780235. (CONF-8303128—Summ.).

From Israel Physical Society annual meeting; Ramat-Gan, Israel (24 Mar 1983).

31254 (INIS-mf—8921, pp 67) **Infra-red spectroscopy of fluorinated silicon.** Janai, M.; Weil, R.; Pratt, B. (Technion-Israel Inst. of Tech., Haifa. Solid State Inst.). 1983. NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780235. (CONF-8303128—Summ.).

From Israel Physical Society annual meeting; Ramat-Gan, Israel (24 Mar 1983).

31255 (INIS-mf—8921, pp 70) **Energy associated with the thermopower for binary mixtures of semiconductors.** Halpern, V. (Bar-Ilan Univ., Ramat-Gan (Israel). Dept. of Physics). 1983. NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780235. (CONF-8303128—Summ.).

From Israel Physical Society annual meeting; Ramat-Gan, Israel (24 Mar 1983).

31256 (INIS-SU—197, pp 71-72) **Semiempirical calculations of electronic structure of quasi-molecular centers in LiF crystals.** Dzelme, Yu.R.; Kotomin, E.A.; Shlyuger, A.L. (Latvijskij Gosudarstvennyj Univ., Riga (USSR)). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780108.

In Radiation damage physics and radiation technology.

Electron-hole structure of alkali-halide crystals is investigated. Semiempirical quantum-mechanical method for calculation based on disregard of differential overlapping within the frames of the model of molecular clusters is used. Electronic structure of H, Vsub(K), Vsub(Z)-centres and pairs of [F-H], [F-Vsub(K)], [F-Vsub(Z)] centres in LiF crystal is determined. A principal possibility of production and energy of typical tunnel luminescence of the pairs are discussed.

31257 (INIS-SU—197, pp 73-75) **Study of the electronic structure of radiation defects in crystals KCl:LiCl.** Gorbenko, P.K.; Gromovoj, Yu.S.; Kovtun, A.A. (Kievskij Politekhnicheskij Inst. (Ukrainian SSR)). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780108.

In Radiation damage physics and radiation technology.

Investigations of electron structure of radiation defects in KCl:LiCl crystals are conducted in connection with study on mechanisms of X-ray and γ-radiation interaction with cation sublattice of alkali-halogen crystals. Three types of defects have been revealed in irradiated crystals using the optical and electron paramagnetic resonance (EPR) methods. EPR spectrum comprising four lines of huperfine interaction with parameters g=2.034+-0.002 and constant of huperfine interaction A=(25+-2) E is observed from the first type of defects at 4.2 K. The spectrum is identified with lithium neutral atoms localized in anion vacancies. Optical induced dichroism is observed from defects forming two bands with 2.42 eV and 2.25 eV absorption maxima after crystal illumination by polarized light along [110]. Formation of the bands is explained by F-band splitting by lithium interstitial ions. Two absorption bands with 2.25 eV 1.9 eV maxima are revealed in spectra of induced dichroism. Analysis of dose and concentration dependences of these bands permits to interprete them as optical transitions in LiK and Li_2 molecules respectively.

31258 (INIS-SU—203, pp 27-31) **Impurity effects on radiation swelling of crystals.** Saralidze, Z.K.; Kvachantiradze, G.G. (Nauchno-Issledovatel'skij Inst. Stabil'nykh Izotopov, Tbilisi (USSR)). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780155.

In Radiation damage physics and radiation technology.

An expression is derived for the swelling rate as a function of impurity concentration and the intensity of point defect formation with taking into account a strong screening of sinks (voids and dislocations) by impurities. For large concentrations, when the distances of sink screening by impurities are smaller than the linear dimensions of the sinks (the void radius and the radii of spontaneous trapping of point defects by dislocations), the dependence of the swelling rate on the impurity concentration C_0 and the intensity of point defect formation Q is shown to differ essentially from that for the normal case of unscreened sinks.

31259 **(INIS-SU—203) Radiation damage physics and radiation technology.** (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1982. 106p. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780155.

Individual items in scope for the data base were processed separately.

31260 (INIS-SU—222, pp 30-32) **H-centers conversion into I-centers in alkali iodides.** Berzinya, B.A.; Intenberg. L.Eh. (AN Latvijskoj SSR, Riga. Inst. Fiziki). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

The interaction of F, H centers created by excitons in KI and RbI crystals has been studied at 12 K. In the crystals coloured by excitons the recombination lUminescence due to an optical stimulation of electron centers has been investigated. The preliminary orientation of the hole-centers indicates that the emission bands at 440 nm (2.82 eV) in KI and 490 nm (2.54 eV) in RbI are due to a luminescence center based on the H-center. A new type of luminescence center is obtained in form of H-plus- electron center. It has been shown that in the case of the thermally stable H, F centers the optical stimulation of electron centers leads to the H centers conversion into I-centers. The kinetic investigations of luminescence let us to assume that close placed F, H centers in pairs spontaneously convert into α, I-centers which annihilate reestablishing the non-defect crystal structure.

31261 (INIS-SU—222, pp 44-45) **Nature of some paramagnetic centers in electron-irradiated glasses.** Obraztsova, E.V.; Lutsejko, V.P.; Kuz'min, I.I. 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

The parametric absorption has been studied in Na_2O-SiO_2-apd Na_2O-B_2O_3-SiO_2 glasses irradiated with first electrons of energy approx. 8 MeV up to fluence of $5x10^{18}$ cm^{-2} In EPR spectra of all investigated compositions after electron bombardement with the fluence more than $i0^{18}$ cm^{-2}, the component with gsub(eff)=2 Which was observed later in K_2O-SiO_2-glasses and attributed to the intrinsic defect of Si-O type was found. It was also established that in Na-B-Si glasses with Na_2O/B_2O_3=0.32 (for SiO_2>=65 mol. %) EPR signal ("five-line-plus-a-shoulder") was connected with Na-B and Na-Si phases of a glas matrix; in the composition with $Na_2O>B_2O_3$ the parametric absorption was attributed to Na-Si-phase only. In Na-B-Si glasses with SiO_2<55 mol. % and Na_2O/B_2O_3>=0.39 no EPR signal (in the x-range) was registered.

31262 (INIS-SU—222, pp 51-52) **EPR in iron-doped gamma irradiated cadmium sulfide single crystals.** Galushka, A.P.; Belozerova, L.V.; Shul'ga, S.Z. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

The Fermi level behaviour in γ-irradiated iron-doped high resistance cadmium sulfide signale crystals is studied by EPR. The temperature dependence, influence of light irradiation on the γ induced paramagnetic centers and annealing proper ty of the observed EPR spectrum are investigated. It is shown that Fe^{++} ions are turned into Fe^{+++} paramagnetic state at temperatures of 130 K. The observed temperature dependence of the paramagnetic absorption, annealing character and light illumination influence on the EPR intensity are interpreted by a proposed zone model. The paramagnetic probe method efficiency is shown.

31263 (INIS-SU—222, pp 58-60) **Effect of radiation defects on the transparency of alkali-halide monocrystals in the average IR-range.** Gektin, A.V.; Charkina, T.A.; Shiran, N.V. (Vsesoyuznyj Nauchno-Issledovatel'skij Inst. Monokristallov, Stsintilyatsionnykh Materialov i Osobo Chistykh Veshestv, Kharkov (Ukrainian SSR)). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

The optical absorption coeff.icient (α) measured at 10.6 m by CO_2-laser calorimetry of α-irradiated KCl and NaCl single crystals is studied. A subsequent annealing of samples restores the absorption, F-luminescence during the annealing of samples increases α. The main role of F-aggregate centers in the increase of absorption at 10.6 m is set on the base of comparing the result on the transition from F centers to aggregate centers for γ-irradiated and additively coloured crystals. The correlation between the absorption coefficient and presence of both interstitial of V-type centers and interstitial dislocation loops is not observed.

31264 (LBL—17293) **Far infrared optical properties of $NbSe_3$.** Challener, W.A.; Richards, P.L. (Lawrence Berkeley Lab., CA (USA)). Feb 1984. Contract AC03-76SF00098. 5p. (CONF-840725—3-Summ.). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84009223.

From 3. international conference on infrared physics; Zurich, Switzerland (23 Jul 1984).

We have measured the far infrared reflectance of $NbSe_3$ and have used a Kramers-Kronig analysis to obtain the estimate of the frequency dependence of the conductivity, δ_1 (ω). The qualitative features of the conductivity include many phonons which appear below T_2, and a low frequency contribution from the free carriers and the pinned mode.

31265 (LBL—17802) **Photothermal spectroscopy and imaging of GaAs.** Amer, N.M.; Haller, E.E.; Weber, E.R. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 16p. (CONF-8404162—1). NTIS, PC A02; 3; GPO Dep. Order Number DE84012312.

From 3. international conference on semi-insulating III-V materials; Warm Springs, OR, USA (24 Apr 1984).

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Using photothermal spectroscopy, spatially-resolved imaging of LEC undoped GaAs wafers has been performed. The observation of subsurface and surface inhomogeneities a few microns in dimensions is reported. Upon heating the wafers to 250°C in a nitrogen atmosphere these inhomogeneities disappear. Concluded from analysis of the photothermal signal is that the inhomogeneities are arsenic-rich inclusions. This conclusion is verified by scanned Auger spectroscopy. Photothermal spectroscopy has also been used to investigate gap-state absorption (0.5 to 1.5 eV) of undoped, Cr-, and Si-doped crystals and to study the effect of plastic deformation on the absorption spectrum. In addition to reproducing the known absorption features, in some of the samples a peak at 0.5 to 0.6 eV has been observed which is tentatively attributed to Fe impurities.

31266 (SAND—84-0724C) **Ion implantation damage in alkaline-earth fluorides.** Arnold, G.W. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1984. Contract AC04-76DP00789. 6p. (CONF-8406129—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012653.

From MRS European meeting; Strasbourg, France (5 Jun 1984).

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Nuclear waste media may contain crystalline phases which can be damaged by α-particles and recoil nuclei. The lattice damage induced in the crystalline alkaline-earth fluorides (CaF_2, SrF_2, BaF_2) by 25 keV He and 380 keV Kr has been studied using cantilever beam techniques and Rutherford backscattering (BRS) channeling measurements. Maximum compressive stress was obtained at fluence values for which RBS disorder reached random levels. Fluorine displacement values were an order of magitude greater than Ca in He-implanted CaF_2. These results indicate that α-particle damage could be an important part of the radiation damage induced in waste media containing crystalline phases. 15 references, 5 figures, 1 table.

31267 (UCRL—90827) **Interaction of flow and phase separation: kinetics, structure, rheology.** Hopper, R.W. (Lawrence Livermore National Lab., CA (USA)). 15 May 1984. Contract W-7405-ENG-48. 19p. (CONF-840745—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012263.

From Symposium on glass science and technology, problems and prospects for 2004; Vienna, Austria (1 Jul 1984).

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This paper advances the thesis that the interactions of the flow, structure, rheology and phase separation kinetics of phase-separating glass-forming systems is a field that ought to be studied systematically, aggressively, and scientifically. 50 references.

31268 **Observation of bulk superconductivity in $EuMo_6S_8$ under pressure.** Decroux, M.; Lambert, S.E.; Torikachvili, M.S.; Maple, M.B.; Guertin, R.P.; Woolf, L.D.; Baillif, R. (Department of Physics and Institute for Pure and Applied Physical Sciences, University of California, San Diego, La Jolla, California 92093). *Physical Review Letters;* **52**: No. 17, 1563-1566(23 Apr 1984). Contract AT03-76ER70227.

The upper critical magnetic field of $EuMo_6S_8$ in its high-pressure superconducting phase was measured resistively at 16 kbar in dc magnetic fields to 28 T. The data can be described by multiple pair-breaking theory including a negative exchange field due to the Eu^{2+} ions that acts on the superconducting electrons. Measurements of the ac heat capacity of $EuMo_6S_8$ above ~13 kbar revealed that the compound exhibits bulk superconductivity, but no Meissner effect was observed in magnetization measurements.

31269 **Beam-exposure dependence and mechanisms of photon-stimulated desorption from alkali fluorides.** Parks, C.C.; Shirley, D.A.; Loubriel, G. (Materials and Molecular Research Division, Lawrence Berkeley Laboratory and Department of Chemistry, University of California, Berkeley, California 94720). *Physical Review [Section] B: Condensed Matter;* **29**: No. 8, 4709-4715(15 Apr 1984).

Photon-stimulated desorption experiments were performed on the (001) face of LiF for photon energies near the F(2s) and Li(1s) edges (from 37 to 72 eV). There are structures in the F^+ yield above the F(2s) edge which are absent in the Li^+ spectrum, differences in detail in the Li^+ and F^+ yields near the Li(1s) edge, and considerable broadening of the desorption yields as compared to the bulk photoabsorption spectrum. The first observation of a strong x-ray and visible beam-exposure dependence of ion yields from LiF and NaF is also presented. These results are discussed in terms of electronic and defect properties of alkali halides.

31270 **Inelastic neutron scattering measurements of the diffusion in β-Ag_2S.** Grier, B.H.; Shapiro, S.M.; Cava, R.J. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review [Section] B: Condensed Matter;* **29**: No. 7, 3810-3814(1 Apr 1984).

Inelastic neutron scattering measurements have been performed onAg_2S in both the cubic superionic phase (T>450 K) and the monoclinic low-ionic conductivity phase (T<450 K). The diffuse scattering observed in x-ray measurements in the superionic phase near Q = (1.6,1,0) is shown to be entirely due to inelastic scattering resulting from correlations among the delocalized silver ions. A low-energy (~2-meV) excitation has been observed at Q = (1.6,1,0) in the room-temperature phase which may be related to a local mode of the silver atoms. The energy of this mode decreases as temperature is increased. The results are discussed in terms of the "microdomain" model of silver diffusion in β-Ag_2S developed to explain the x-ray scattering results.

31271 **High-field specific heats of A15 V_3Si and Nb_3Sn.** Stewart, G.R.; Brandt, B.L. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *B: Condensed Matter;* **29**: No. 7, 3908-3912(1 Apr 1984).

In order to further understand the anomalous behavior of the specific heat of Nb_3Sn in an 18-T magnetic field discovered by Stewart, Cort, and Webb [Phys. Rev. B 24, 3841 (1981)], we have performed specific-heat measurements on a different sample of Nb_3Sn at lower fields both in the normal and mixed states, as well as measurement to 19 T on both transforming and nontransforming V_3Si. The high-field data for V_3Si indicate that this material behaves quite normally, and that γ/sup trans/<γ/sup nontrans/, in agreement with a recent analysis by Junod and Muller [Solid State Commun. 36, 721(1980)]. Nb_3Sn, however, remains anomalous, with both the same "kink" in the normal-state field data as observed by Stewart, Cort, and Webb (although at a slightly higher temperature) and unusual mixed-state behavior. The mixed-state specific heat of the V_3Si samples is as expected, based on earlier work on the mixed-state specific heat of V and Nb.

31272 **Magnetic ordering in CeM_2Si_2 (M = Ag,Au,Pd,Rh) compounds as studied by neutron diffraction.** Grier, B.H.; Lawrence, J.M.; Murgai, V.; Parks, R.D. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *B: Condensed Matter;* **29**: No. 5, 2664-2672(1 Mar 1984).

We report the results of neutron-diffraction experiments on CeM_2Si_2 (M = Ag,Au,Pd,Rh) which were performed to explore the role of valence fluctuations and 4f hybridization in the magnetic ordering of cerium compounds. All four order antiferromagnetically, the first three exhibiting structures consisting of ferromagnetic layers with moments perpendicular to the layers, which are believed to be characteristic of 4f-4f interactions mediated through hybridization with conduction electrons. $CePd_2Si_2$ has an anomalously small moment (0.62μ/sub B/) in the ordered state. $CeAg_2Si_2$ exhibits an incommensurate longitudinal, static magnetization wave with moment and propagation direction along the a axis. The fourth compound, $CeRh_2Si_2$, has the highest known transition temperature (39 K) reported for cerium ordering; it exhibits another second-order transition at 27 K to a complex commensurate structure with modulated moments. The results are discussed in terms of the effects that 4f hybridization can have on ordering.

31273 **Radiative cooling with MgO and/or LiF layers.** Berdahl, P. (University of California, Lawrence Berkeley Laboratory, Berkeley, California 94720). *Applied Optics;* **23**: No. 3, 370-371(1 Feb 1984). Contract AC03-76SF00098.

The ability of layers of magnesium oxide and/or lithium fluoride to produce lower temperatures than other radiating materials is discussed.

31274 **(UCRL-Trans—11969) Second harmonic generation in $LiNbO_3$ crystals with periodic laminar ferroelectric domains.** Hue, Y.H.; Min, N.B.; Zhu, J.S.; Feng, D. Translated from *Wu Li Hsueh Pao ;* **32**: No. 12, 1515-1525(1983). Contract W-7405-ENG-48. 30p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012974. DE84012974

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The second harmonic generation of light in $LiNbO_3$ crystals with periodic laminar ferroelectric domains was investigated, in order to make a detailed experimental verification of the theory of quasi-phase-matching proposed by N. Bloembergen et al. First, we determined the second harmonic light intensity of single domain $LiNbO_3$ crystals in the scheme e/sup omega/ . e/sup omega/ → e/sup 2 omega/ using the Maker tracing method to carry out a direct experimental measurement. Then, by using the angle-scanning and temperature-scanning methods, we obtained the maximum second harmonic output from crystals with periodic domains corresponding.

40 CHEMISTRY

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REFER ALSO TO CITATION(S) 30151, 30164, 30167, 30292, 30401, 30402, 30404, 30407, 30408, 30409, 30410, 30411, 30412, 30413, 30414, 31265, 31728, 31730, 31733

31275 **(AD-A—953026/2) Investigations of rare earth problems. Final report.** Moeller, T.; Audrieth, L.F. (Illinois Univ., Urbana (USA)). 30 Sep 1950. 103p. NTIS, PC A06/MF A01.

31276 **(AECL—7696) Automated controlled-potential coulometric determination of uranium.** Knight, C.H.; Clegg, D.E.; Wright, K.D.; Cassidy, R.M. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jun 1982. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701830.

A controlled-potential coulometer has been automated in our laboratory for routine determination of uranium in solution. The CRNL-designed automated system controls degassing, prereduction, and reduction of the sample. The final result is displayed on a digital coulometer readout. Manual and automated modes of operation are compared to show the precision and accuracy of the automated system. Results are also shown for the coulometric titration of typical uranium-aluminum alloy samples.

31277 **(BARC—1190) Spectrophotometric determination of zirconium with arsenazo-III after extraction with thenoyl tri fluoroacetone.** Kartha, P.K.S.; Kasi, J.A.; Ramanujam, A.; Nadkarni, M.N. (Bhabha Atomic Research Centre, Bombay (India)). 1983. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701704.

An extractive spectrophotometric method has been standardized for the analysis of zirconium in the range of 12 to 60 micrograms. The method involves the extraction of zirconium from 1.0 M nitric acid solution into 0.1 M HTTA in benzene and its determination in the organic extract by spectrophotometry as Arsenazo III complex. Interference due to iron and plutonium can be suppressed by the addition of ascorbic acid and hydroxyl amine hydrochloride prior to NTTA extraction. Cerium up to 1.6 mg and U(VI) up to 50 mg do not interfere. Th up to 1 mg also does not interfere significantly. The overall precision of this method has been found to be +- 2.5%. It is adaptable for the analysis of zirconium arising from the possible dissolution of zircaloy cladding during dissolution of irradiated uranium fuels in Purex process.

31278 **(BARC—1197) Analytical methods for the determination of boron in reactor materials programme.** Chitre, R.S.; Joshi, V.R.; Iyer, C.S.P. (Bhabha Atomic Research Centre, Bombay (India)). 1983. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701703.

Spectrophotometric methods of determination of boron based on the complexation reaction between boric acid and protonated curcumin are briefly reviewed. Direct determination of boron in heavy water, plant leaves, copper and its alloys, and aluminium and its alloys using a modified method of Hayes and Metcalfe is described. A method for determination of boron, when its content is very low as in case of uranium metal, diuranate, uranium oxide and thorium nitrate, is also described. In this method, boron is first separated as methyl borate by distillation of the sample with methanol in acid media. The distilled ester is absorbed by hydroxide solution and boron is analysed after removal of methanol. The precision obtained is indicated.

31279 (DOE/ER/60142—1, pp 83-88) **Determination of microdosimetric parameters in fluctuating radiation fields: the variance-covariance method.** Kellerer, A.M.; Rossi, H.H. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

It is evidently of importance that the events in two microdosimetric detectors are statistically independent, i.e., correlated charged particles must not traverse the two counters. If the two counters are in a plane orthogonal to the radiation field the condition will usually be fulfilled. In many radiation fields it will be met even with arbitrary relative position of the two detectors. The method has the advantage that microdosimetric measurements can be performed in fields where the dose rate may fluctuate by orders of magnitude. An incidental advantage of the technique is a considerable relaxation of the requirements for pressure and voltage stability, provided the variations affect both counters simultaneously. 6 references, 1 figure.

31280 (IAEA-TECDOC—280, pp 13-44) **Instrumental aspects of tube-excited energy-dispersive X-ray fluorescence analysis.** Adams, F.; Nullens, H.; Espen, P. van (Rijksuniversitair Centrum te Antwerpen (Belgium)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

Energy-dispersive X-ray fluorescence spectrometry is an attractive and widely used method for sensitive multi-element analysis. The method suffers from the extreme density of spectral components in a rather limited energy range which implies the need for computer based spectrum analysis. The method of iterative least squares analysis is the most powerful tool for this. It requires a systematic and accurate description of the spectral features. Other important necessities for accurate analysis are the calibration of the spectrometer and the correction for matrix absorption effects in the sample; they can be calculated from available physical constants. Ours and similar procedures prove that semi-automatic analyses are possible with an accuracy of the order of 5%.

31281 (INIS-mf—7782, pp 116-120) **Investigation on stability of samples of selected radionuclides in liquid scintillators during measurement of standard solutions.** Radoszewski, T.; Terlikowska, T. 1979. (In Russian). NTIS (US Sales Only), PC A13/MF A01. Order Number TI83780837. (CONF-7905228—).

From International symposium on methods of production and measurement of standard sources and solutions; Marianske Lazne, Czechoslovakia (15 May 1979).

Results have been presented of study of stability of radiation sources in liquid scintillators which had been prepared for measurement of radioactivity concentration in standard solutions. Investigations were made for two liquid scintillators: one which has been based on toluene and has contained butyl - PBD as a scintillator and the second which has been based on toluene and tritone and has contained PPO as a scintillator as well as the bis-MSB as a spectrum shifter. Influence has been studied of homogenity of radiation sources, on the value of the radioactivity concentration which had been obtained. It has been established that the condition for correct measurement is homogenity of sources to be measured. As a result of investigation, recommendations have been given for selection of a scintillator for certain radioactive nuclides.

31282 (INIS-mf—8961, pp 314-317) **Computation software for processing gamma-spectra being obtained in application of detectors.** Radu, D.; Turkanu, K.N.; Tanase, K. 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

Description is given of the simple but accurate enough computer program for on-line processing of complicated spectra with complicated peaks and multiplets. The program is intended for small computers. The program has been written on FOCAL-8 for PDP-8/I computer used together with the Nuclear Data 50/50 analyzer. Gamma-spectra which have been registred by means of Ge(Li) detectors were analysed.

31283 (INIS-mf—8961, pp 186-194) **Investigations in the field of development of methods for determination of composition of spent fuels from WWER-type reactors.** Makarova, T.P.; Preobrazhenskaya, L.D.; Fridkin, A.M.; Nikitina, S.A.; Ryzhinskij, M.V.; Lovtsyus, A.V.; Stepanov, A.V.; Lipovskij, A.A. 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

Precision laboratory methods have been discussed in the paper which were practically used on the Khlopin Radium Institute for analysis of uranium and plutonium, for determination of the burnup degree on the base of ^{148}Nd and for determination of isotopes of the transplutonium elements. Methods are considered of the potentiometric titration and differential spectrophotometry for analysis of uranium as well as of the method of isotopic dilution with α-spectrometric ending for analysis of plutonium.

31284 (INIS-mf—8962, pp K2) **Neutron yields from uranium-fluorine compounds.** Boneh, Y.; Goshen, S.; Karpas, Z.; Shahal, O.; Wolf, A. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31285 (INIS-mf—8962, pp H11) **Potentiometric investigation of uranyl(VI)- and thorium(IV)-glutathionate systems.** Taskaeva, M. (Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika); Bismondo, A.; Rizzo, L. (Consiglio Nazionale delle Ricerche, Padua (Italy). Lab. di Chimica e Tecnologia dei Radioelementi). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31286 (INIS-SU—198, pp 537) **Reference data file for the purposes of neutron activation analysis.** Kabina, L.P.; Kondurov, I.A.; Shsterneva, I.M. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

31287 (INIS-SU—198, pp 539) **Measurement of the ^{109}Cd radioactivity in a source by the 4Te-x coincidence method.** Aristov, E.A.; Bazhenov, V.A.; Bakhshi-zade, V.A.; Sokolova, T.N. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

31288 (IS-M—469) **Versatility of laser induced fluorescence line narrowing in chemical analysis.** McGlade, M.J.; Hayes, J.M.; Small, G.J.; Heisig, V.; Jeffrey, A.M. (Ames Lab., IA (USA); Iowa State Univ. of Science and Technology, Ames (USA). Dept. of Chemistry; Columbia Univ., New York (USA). Cancer Center). 1983. Contract W-7405-ENG-82. 6p. (CONF-831025—33). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012834.

From 26. ORNL-DOE conference on analytical chemistry in energy technology; Knoxville, TN, USA (11 Oct 1983).

Laser excited fluorescence line narrowing spectroscopy (FLNS) in organic glasses at low temperatures has previously been shown to be a high sensitivity and resolution technique for the analysis of polycyclic aromatic hydrocarbons (PAH) in real samples. In this paper the versatility of FLNS is underscored by application to amino-PAH, PAH metabolites and aromatic carcinogen-DNA adducts.

31289 (IS-M—471) Preliminary study on the determination of boron and cadmium impurities in uranium oxide and uranium metals by inductively coupled plasma-atomic emission spectroscopy. Bear, B.R.; Edelson, M.C.; Gopalan, B.; Fassel, V.A. (Ames Lab., IA (USA); Nuclear Fuel Complex, Hyderabad (India). Control Lab.). 1983. Contract W-7405-ENG-82. 7p. (CONF-831025—34). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012831.

From 26. ORNL-DOE conference on analytical chemistry in energy technology; Knoxville, TN, USA (11 Oct 1983).

Boron and cadmium impurities in U metal and U_3O_8 may be determined by inductively coupled plasma-atomic emission spectroscopy (ICP-AES) after their separation from the U matrix by multiple extractions with tri-n-octyl phosphine oxide (TOPO). Useful precision and accuracy were obtained at concentrations of ~ 0.2 μg/g U.

31290 (JINR—R-12-83-330) Simulation of thermochromotographic processes by the Monte-Carlo method. Zvara, I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1983. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701706.

A simplified microscopic model is proposed for the gas adsorption thermochromatography in open columns with laminar flow of the carrier gas. This model describes the downstream migration of a sample molecule as a rather small number of some effective random displacements and sequences of adsorption-desorption events that occur without changing the coordinates. The relevant probability density distributions are thereby derived. Based on this model, a computer program has been developed for simulating thermochromatographic zone profiles by employing the Monte-Carlo technique. The program is versatile in accounting for a wide range of experimental conditions and for treating various properties of the species to be separated. Some results of these simulations are given to demonstrate the influence of several parameters on the zone profile.

31291 (MINTEK-M—76) Mineralogical investigation of a refractory gold ore, and of a sulphide concentrate and calcined tailing from that ore. Ollila, J.T. (Council for Mineral Technology, Randburg (South Africa)). 15 May 1983. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701701.

This report covers an investigation into the manner of occurrence of gold in an old mine dump of calcined tailings at the Fairview Mine. Previous investigations had not revealed the whereabouts of the gold still present in this dump, which amounts to between 10 and 12p.p.m. In the present investigation, in which heavy-liquid separation was combined with X-ray, microscope, and electron-microprobe investigations, it was found that a significant proportion of the gold is adsorbed on carbon, and that a smaller proportion is present in pyrite that escaped complete calcination. An enigma is the occurrence of ferrosilicon, some of which contains gold. Although this study produced new information, a more detailed quantitative investigation is required in which an image analyser should be used to provide reliable quantitative data.

31292 (MLM—3148(OP)) Simultaneous calorimetric assay system: a transportable device to measure plutonium. Rakel, D.A.; Wetzel, J.R.; Duff, M.F. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1984. Contract AC04-76DP00053. 6p. (CONF-840531—4). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012398.

From 6. annual symposium on safeguards and nuclear material management; Venice, Italy (14 May 1984).

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The Simultaneous Calorimetric Assay System measures the thermal power of a sample by calorimetry and at the same time the relative concentrations of the heat producing nuclei in the sample. This transportable instrument, which was developed at MRC-Mound, provides a nondestructive determination of the plutonium content of the sample. This paper describes the instrument and its performance in tests at Mound and in a field test. 7 references, 3 figures, 1 table.

31293 (NIM—2011) Analysis of anode sludges, and their process solutions and beneficiation products. Dixon, K.; Russell, G.M.; Wall, G.J.; Eddy, B.T.; Mallett, R.C.; Royal, S.J. (National Inst. for Metallurgy, Johannesburg (South Africa)). 24 Aug 1979. 52p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701702.

As previous methods for the analysis of anode slimes have required lengthy separations, instrumental procedures were developed that require no preparation of the sample or only simple procedures such as acid digestion and fusion. Comparative values for various techniques are given. Methods for the analysis of process solutions and beneficiation products are examined and the procedures that have been adopted together with their relative merits and applicability are discussed. Methods of analysis include: atomic-absorption spectrophotometry, x-ray-fluorescence spectrophotometry, x-ray-fluorescence spectrometry, instrumental neutron-activation analysis and optical emission spectrometry.

31294 (UCID—20094) Materials characterization capabilities at DOE Nuclear Weapons Laboratories and Production Plants. Pyper, J.W. (Lawrence Livermore National Lab., CA (USA)). Jun 1984. Contract W-7405-ENG-48. 24p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84013183.

The materials characterization and analytical chemistry capabilities at the 11 DOE Nuclear Weapons Laboratories or Production Plants have been surveyed and compared. In general, all laboratories have similar capabilities and equipment. Facilities or capabilities that are unique or that exist at only a few laboratories are described in detail.

31295 (UCRL—53506-Vol.1) Portable microcomputer for the analysis of plutonium gamma-ray spectra. Volume I. Data analysis methodology and hardware description. Ruhter, W.D. (Lawrence Livermore National Lab., CA (USA)). May 1984. Contract W-7405-ENG-48. 68p. (ISPO—209-Vol.1). NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012999.

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A portable microcomputer has been developed and programmed for the International Atomic Energy Agency (IAEA) to perform in-field analysis of plutonium gamma-ray spectra. The unit includes a 16-bit LSI-11/2 microprocessor, 32-K words of memory, a 20-character display for user prompting, a numeric keyboard for user responses, and a 20-character thermal printer for hard-copy output of results. The unit weights 11 kg and had dimensions of 33.5 x 30.5 x 23.0 cm. This compactness allows the unit to be stored under an airline seat. Only the positions of the 148-keV ^{241}Pu and 208-keV ^{237}U peaks are required for spectral analysis that gives plutonium isotopic ratios and weight percent abundances. Volume I of this report provides a detailed description of the data analysis methodology, operation instructions, hardware, and maintenance and troubleshooting. Volume II describes the software and provides software listings.

31296 (UCRL—53506-Vol.2) Portable microcomputer for the analysis of plutonium gamma-ray spectra. Volume II. Software description and listings. Ruhter, W.D. (Lawrence Livermore National Lab., CA (USA)). May 1984. Contract W-7405-ENG-48. 78p. (ISPO—209-Vol.2). NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84013000.

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A portable microcomputer has been developed and programmed for the International Atomic Energy Agency (IAEA) to perform in-field analysis of plutonium gamma-ray spectra. The unit includes a 16-bit LSI-11/2 microprocessor, 32-K words of memory, a 20-character display for user prompting, a numeric keyboard for user responses, and a 20-character thermal printer for hard-copy output of results. The unit weights 11 kg and has dimensions of 33.5 x 30.5 x 23.0 cm. This compactness allows the unit to be stored under an airline seat. Only the positions of the 148-keV ^{241}Pu and 208-keV ^{237}U peaks are required for spectral analysis that gives plutonium isotopic ratios and weight percent abundances. Volume I of

this report provides a detailed description of the data analysis methodology, operation instructions, hardware, and maintenance and troubleshooting. Volume II describes the software and provides software listings.

31297 (ZfI-Mitt—71, pp 106-112) **Determination of oxide film thickness on aluminium using 14-MeV neutron activation and BET method.** Foerster, H. (VEB Mansfeld Kombinat Wilhelm Pieck, Freiberg (German Democratic Republic). Forschungsinstitut fuer NE-Metalle). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A new method is described for the determination of the mean film thickness of aluminium oxides by 14-MeV neutron activation analysis of the oxygen and by BET measurement of the surface area. The mean film thickness obtained is independent of the surface roughness. Stable oxide films consisting of only a few atomic layers of oxygen are detected on aluminium.

31298 (ZfI-Mitt—71, pp 128-136) **Substoichiometric determination of Pd-II-traces with dithizone and problems of determination.** Wagler, H. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Dithizone is frequently used for the substoichiometric separation of trace amounts of metals. In the case of substoichiometric Pd-extraction there are some problems in the reproducibility of determination, because of the existence of two tautometric species of dithizone in organic solvents. Referring to data cited in the literature it is supposed that only the thiol form of dithizone reacts with metal ions. Extensive studies of the reaction between Pd(II) and dithizone using ^{103}Pd suggest an extraction mechanism with the thione form.

31299 (ZfI-Mitt—71, pp 296-307) **Autoradiography of gallium in silicon.** Birkholz, W.; Treutler, H.C.; Freyer, K.; Geisler, M.; Dubnack, J. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Nuclear techniques (autoradiography, gamma spectroscopy, and neutron activation analysis) have been used to determine Ga and its distribution as well as impurities in Ga-doped Si.

31300 (ZfI-Mitt—71, pp 308-316) **Quantitative autoradiography of semiconductor basic materials.** Treutler, H.C.; Freyer, K. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Autoradiographic techniques for the quantitative determination of P and B in silicon are described. The local concentration and distribution of P was determined with silver halide films after neutron activation. In the case of B neutron-induced autoradiography was applied using the reaction $^{10}B(n, alpha)^{7}Li$. The emitted alpha particles were registered by a solid-state track detector. B-implanted or -diffused and P-diffused silicon disks were used as calibration standards.

31301 (ZfI-Mitt—71, pp 99-105) **Use of technical mixtures of carboxylic acids to the extraction of silver.** Smulek, W. (Institute of Nuclear Research, Warsaw (Poland)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The application of technical mixtures of carboxylic acids, obtained from a Polish oil mill, to the extraction of silver, gold, and europium is described. The distribution ratio is given as a function of HNO_3 and H_2SO_4 concentrations, extractant and metal concentrations, and nature of diluent.

31302 (ZfI-Mitt—71, pp 165-170) **Separation of reduced molybdenum from fission products. The Mo-HNO_3-HDEHP system.** Smulek, W.; Borkowski, M. (Institute of Nuclear Research, Warsaw (Poland)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The extraction of reduced molybdenum and Mo/VI/ by di(2-ethylhexyl)phosphoric acid (HDEHP) as the extractant has been studied. The behaviour of the accompanying fission products iodine, tellurium and ruthenium has also been studied. The effects of nitric acid and hydrogen peroxide concentrations, temperature and kinetics on the extraction and reextraction yield of molybdenum are reported.

31303 (ZfI-Mitt—71, pp 277-295) **Study of boron diffusion in high temperature Ni-base alloys by means of solid-state track detectors.** Mysak, F.; Krejci, M.; Hakl, J.; Smrkovsky, E. (National Research Institut for Materials, Prague (Czechoslovakia)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

High thermally stressed components of gas turbines are made of high temperature Ni-base alloys. Turbine parts are bonded by brazing. The application of interlayer alloys having similar composition to that of the bonded material, represents a progressive brazing technique. In this case the interlayer alloy is modified by the addition of elements, reducing the liquidus temperature. Boron was found to be an optimum depressant. Using autoradiography and solid-state track detectors, the distribution of boron after bonding, as well as after annealing was studied by means of neutron irradiation produced boron isotopes in the brazing alloy.

31304 **Surface-enhanced Raman scattering on silver-coated teflon sphere substrates.** Goudonnet, J.P.; Begun, G.M.; Arakawa, E.T. (Oak Ridge National Lab., TN). *Chemical Physics Letters;* **92**: No. 2, 197-201(15 Oct 1982). Contract W-7405-ENG-26.

A simple experimental method for detecting organic species adsorbed on surfaces by surface-enhanced Raman scattering (SERS) is described. The rough silver surfaces were obtained by vapor deposition of Ag on teflon spheres of uniform size and shape on glass substrates. The spectra obtained from adsorbed phthalic acid, benzoic acid, and nitrobenzoic acid excited by the 514.5 nm argon-ion laser line showed broad bands near 1580 and 1340 cm^{-1}. With 633.0 nm excitation these bands were not present and characteristic line spectra were obtained. The reproducibility of the method due to the well-defined roughness of the substrate constitutes a good tool by which theory can be tested.

31305 **Trifluoromethanesulfonyl chloride for identification of oxygen, nitrogen, and sulfur functional groups by fluorine-19 nuclear magnetic resonance spectrometry.** Shue, F.F.; Yen, T.F. (Univ. of Southern California, Los Angeles). *Analytical Chemistry;* **54**: 1641-1642(1982).

Fluorine reagents, hexafluroacetone, trifluoroacetic anhydride, and trifluoroacetyl chloride have been previously used for ^{19}F NMR for determination of organic structure and functionality. A new fluorine reagent, trifluoromethanesulfonyl chloride, is discussed in this paper. The reagent not only yields sulfonation products with active hydrogen containing compounds but also forms stable compounds with tertiary nitrogen bases, presumably by a Lewis acid-Lewis base reaction. The ^{19}F chemical shift for the trifluoromethanesulfonyl derivatives of aliphatic alcohols, primary, secondary, and tertiary; phenols; primary and secondary amines; and pyrollic-ring compounds are presented and discussed in relation

to structural effects. No evidence of reaction of the trifluoromethanesulfonyl chloride acting as a chlorinating reagent was reported.

31306 **(LA-tr—81-8) Improvement of the analytic results of thermal ionization mass spectrometry through electrolytic sample deposition: application of plutonium.** Bergey, C.; Cesario, J.; Deniaud, S. Translated from *Analusis ;* 8: No. 10, 490-495(1980). Contract W-7405-ENG-36. 14p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE81026012. DE81026012

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A method is proposed for the electrodeposition of plutonium on filaments used in thermal ionization mass spectrometers. The electrolytes are dimethylsulfoxide (DMSO) and dimethylformamide (DMF). The electrolysis cell is described, which leads on separate filaments to centered and reproducible deposits, the area of which is 2 mm^2. The electrodeposition yields are in the range of 40 to 70%. Mass spectrometry results from two laboratories demonstrate that improved precision and sensitivity may be obtained using this method, compared to the usual one. The time required for an electrolytic deposit on filament is comparable to the one required for direct depositing. However, the simplicity of manipulations should allow easier automation.

31307 **(LA-tr—82-9) Plutonium content of fast-neutron-reactors fuels by x-ray fluorescence.** Lepetit, H. Translated from *Analusis ;* 8: No. 10, 496-498(1980). Contract W-7405-ENG-36. 9p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE82014232. DE82014232

The plutonium content of (U, Pu)O_2 mixed oxide sintered pellets may be quickly and accurately determined by x-ray fluorescence. This nondestructive technique is unaffected by the density, isotopic abundance, and plutonium content. It can be used to check batch uniformity with better than 0.2% repeatability, and perfectly suited for routine examination of a large number of fuel samples.

31308 **(LA-tr—82-7) Moisture determination in plutonium and uranium-plutonium oxides.** Lepetit, H.; Rozenblum, H. Translated from *Analusis ;* 8: No. 8, 381-383(1980). Contract W-7405-ENG-36. 12p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE82014234. DE82014234

Moisture is eliminated by heating the sample in a constant-flow stream of dry argon. The gas moisture is measured versus time by a hygrometer sensor specific for water vapor. The system is calibrated by injecting known quantities of water vapor into the carrier gas. Virtually all of the moisture is eliminated from the powder at 600°C. Moisture content values ranging from 0.5 to 1.3% have been measured for PuO_2 powder samples, depending on the calcination temperature. For UO_2 + PuO_2 mixed oxide sinters, the water content at 900°C is of the order of 1 to 2 ppM, reaching 10 to 12 ppM after a 6-month storage period.

31309 **(LA-tr—82-12) Determination of plutonium isotopic ratios by gamma-ray spectrometry.** Despres, M.; Malet, G.; Morel, J. Translated from *Analusis ;* 8: No. 10, 512-518(1980). Contract W-7405-ENG-36. 20p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014329. DE82014329

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Plutonium isotopic ratios is now determinated by surface ionization mass spectrometry. This method involves sample dissolution and very expensive apparatus. Nondestructive method of analysis is more adapted for the control in situ of nuclear products. In spite of inconveniences such as keeping of the detector in liquid nitrogen during this working, the non-use in presence of strong activities of fission products and the absolutely necessary determination of 242 plutonium content by isotopic correlation, the gamma-ray spectrometry presents numerous advantages. It is rapid, automatizable and can be integrated either in situ, or in a derivated circuit. The analysis can be made through a stainless steel container and in different matrix (oxides, solutions, etc.) without preliminary calibration. 100 mg of plutonium are necessary for about 1 hour counting time. In very good experimental conditions the accuracy is between 1 and 5%. For routine analysis, with limited counting times, the accuracy can be between 5 and 10%.

31310 **(LA-tr—82-10) Possibilities of plutonium analysis by means of x-ray flourescence with iridium 912 radioactive sources.** Martinelli, P. Translated from *Analusis ;* 8: No. 10, 499-504(1980). Contract W-7405-ENG-36. 15p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014231. DE82014231

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Gamma-ray excitation of the K levels of uranium and plutonium by means of radioisotopic sources, can be applied to the determination of plutonium content in nuclear fuel elements or in solutions. Two apparatus, under construction, have been designed for the determination of U or Pu content in solutions contained in polythenes bottles of 10 ml and of 30 ml capacity. These instruments can be adapted to the examination of U/Pu ratio in fuel elements. They are equipped with ^{192}Ir sources of 20 mCi activity, and with a 200 mm^2 x 8,5 mm Ge/HP) planar detector.

31311 **(LA-tr—82-4) Moisture uptake by plutonium oxide powder.** Benhamou, A.; Beraud, J.P. Translated from *Analusis ;* 8: No. 8, 376-380(1980). Contract W-7405-ENG-36. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014224. DE82014224

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In the scope of installation safety and criticality studies, an assessment was made of moisture uptake by plutonium oxide powder used for oxide fuels. The effects of exposure time, atmospheric relative humidity (9 to 98%), calcination temperature (400-1100°C) and specific area of the PuO_2 powder were evaluated. Based on these parameters, the moisture uptake of the PuO_2 powder varies from 0.1 to 2.5%; moreover, the variation appears to be a linear function to the specific surface area.

31312 **(LA-tr—82-15) On-line measurement of small quantities of plutonium in the presence of americium.** Edeline, J.C. Translated from *Analusis ;* 8: No. 10, 466-468(1980). Contract W-7405-ENG-36. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014326. DE82014326

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Among the passive measuring methods the spontaneous fission neutron coincidence counting has been choice. The fissions are mainly produced by the ^{238}Pu, ^{240}Pu, and ^{242}Pu isotopes. Some of the main results obtained from the measurement of plutonium contaminated solid wastes are recalled. The application of this method for measuring low plutonium concentrations in plutonium and americium containing liquids is presented. Equipment and main obtained results are also reported.

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REFER ALSO TO CITATION(S) 30457, 30458, 30459, 30460, 30461, 30462, 31358

31313 **(AD-A—953021/3) Nitration of oximes. The nitration of azines. Final technical report, 5 Dec 49-4 Dec 51.** Farago, J.; Roberson, E.B. Jr. (George Washington Univ., Washington, DC (USA)). 31 Mar 1952. 73p. NTIS, PC A04/MF A01.

Thesis.

31314 **(BNL—31346) Theory of the Fe^{2+}-Fe^{3+} electron exchange in water.** Friedman, H.L.; Newton, M.D. (State Univ. of New York, Stony Brook (USA). Dept. of Chemistry; Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 23p. (CONF-820917—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84010363.

From Electron and proton transfer conference; Southampton, UK (14 Sep 1982).

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The detailed theory reported earlier by Tembe, Friedman, and Newton is supplemented by calculations of the electronic overlap of the initial and final states for reaction geometries different from those treated earlier. Also a dynamical theory of the outer sphere reorganization process provides an explicit model for devi-

ations from the transition state theory. These results tend to support the earlier calculation of the rate constant.

31315 **(SAND—84-1173C) Pulsed-laser atom-probe studies of surface chemical reactions.** Kellogg, G.L. (Sandia National Labs., Albuquerque, NM (USA)). 11 Jun 1984. Contract AC04-76DP00789. 5p. (CONF-840617—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012811.

From 12. DOE surface science/SUBWOG - 7. SUBWOG - 12B technical exchange meeting; Oak Ridge, TN, USA (11 Jun 1984).

The pulsed-laser and imaging atom-probe are emerging as powerful tools for the study of surface chemical reactions. Detailed studies of molecular processes such as thermal dissociation provide valuable insight into the basic interactions governing a reaction sequence, and extended studies should lead to a complete understanding of simple surface reactions such as CO oxidation, methanation, etc. The combination of these techniques with a high-pressure reactor add a new dimension to the study of surface reactions, and, as the CO oxidation investigation reported here demonstrates, information with direct applicability to commercially important catalytic reactions can be obtained.

31316 (ZfI-Mitt—67, pp 57-79) **Investigations of the sorption of pertechnetate on salts of molybdophosphoric acid.** Suess, M.; Pfrepper, G. May 1983. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780375.

In Reports of the Central Institute for Isotopes and Radiation Research.

Studies were made to investigate the sorption of pertechnetate on neutral and acid salts of molybdophosphoric acid from nitric acid and in the presence of electrolytes and non-electrolytes. Particular, distribution coefficients from 10 to 100 were found. The sorption of pertechnetate can be increased by the addition of K^+, NH_4^+, Rb^+ and Cs^+ salts, by the addition of non-electrolytes the distribution coefficients decrease. A saturation capacity of about 0.19 mmol Tc/g ammonium phosphomolybdate was determined from the adsorption isotherms. The formation of alkali metal pertechnetate associates in the sorbent phase can be supposed.

31317 (ZfI-Mitt—71, pp 113-127) **Investigations of the crystallization process of neodymium doped YAG using radiotracers.** Jaskolska, H.; Walis, L. (Institute of Nuclear Research, Warsaw (Poland)); Janusz, C. (Instytut Technologii Elektronowej, Warsaw (Poland)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

In growing yttrium aluminium garnet monocrystals doped with Nd, ^{147}Nd has been used as a tracer to determine the Nd_2O_3 content and the effective distribution ratio of Nd_2O_3 between the residue material in the crucible and the crystal. For investigating the homogeneous Nd_2O_3 distribution within the crystal autoradiography has been used. Based on the results it was possible to choose optimal growing parameters for getting monocrystals of better quality and at lower costs.

31318 **Transition state theory description of surface self-diffusion: Comparison with classical trajectory results.** Voter, A.F.; Doll, J.D. (Chemistry Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Chemical Physics;* **80**: No. 11, 5832-5838(1 Jun 1984).

We have computed the surface self-diffusion constants on four different crystal faces [fcc(111), fcc(100), bcc(110), and bcc(211)] using classical transition state theory methods. These results can be compared directly with previous classical-trajectory results which used the same Lennard-Jones 6-12 potential and template model; the agreement is good, though dynamical effects are evident for the fcc(111) and bcc(110) surfaces. Implications are discussed for low-temperature diffusion studies, which are inaccessible to direct molecular dynamics, and the use of ab initio potentials rather than approximate pairwise potentials.

4003 Organic Chemistry

REFER ALSO TO CITATION(S) 30159, 30461, 31242, 31360

31319 **(DOE/PC/30227—T3) Quantitation of the reductive cleavage of aryl ethers of SRC and coals. Final report, September 1980-March 1984 .** Woolsey, N.F.; Bartak, D.E. (North Dakota Univ., Grand Forks (USA)). Apr 1984. Contract FG22-80PC30227. 132p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012061.

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The mechanisms of reductive carbon-oxygen bond cleavage in diaryl and arylalkyl ethers were studied. Electrochemical techniques were utilized to measure reduction potentials, relative lifetimes of intermediates, kinetics of for radical anion reactions for selected ethers, and products, which result from cleavage. The electrochemical studies indicated that there were four principal reaction pathways, which were operative for the radical anions of these ethers. They are: (1) unimolecular cleavage, (2) dimerization, (3) protonation, and (4) disproportionation. Chemical cleavage studies of a variety of aryl phenyl and aryl methyl ethers have shown that aryl ring size does not stop cleavage to phenolic products which can be quantitated by the increased hydroxy titer of the sample. The aryl group from aryl phenyl ethers by alpha cleavage was in general not isolated but reduced monomers or dimers were formed instead. The effect of (a) reaction time, (b) reducing metal, (c) metal concentration, (d) ether concentration, and (e) the presence of proton donors on isolation of the aryl hydrocarbon was investigated. Little effect was seen for (a) and (b) but (c), (d) and (e) showed notable effects. Application of this technqiue was attempted on coal samples but experimental details have been completely worked out for these materials. 15 references, 17 figures, 12 tables

31320 (DOE/PC/40774—T1, pp 105-127) **Characterization of Ru zeolite catalysts by a hydrogenolysis test reaction network.** Sajkowski, D.J.; Schwank, J.W.; Goodwin, J.G. Jr. 1 Oct 1983. NTIS, PC A10/MF A01. Order Number TI84002414.

In Site activities of zeolite-supported Ru for CO hydrogenation. Final report.

The activity of a series of RuNaY zeolites with different ruthenium loadings has been investigated in a flow reactor using the hydrogenolysis of ethane, propane and cyclopropane as test reactions. The RuNaY catalysts showed similar activity in ethane and propane hydrogenolysis compared to Ru/SiO_2 catalysts. However, the activity of the RuNaY catalysts for cyclopropane hydrogenolysis was by orders of magnitude higher than that of Ru/SiO_2. The RuNaY samples showed high selectivity toward propane formation, an effect which was previously observed on highly dispersed Ru/SiO_2 catalysts. It was observed that cyclopropane was sieved out of the reactant stream by the zeolite structure at the cyclopropane hydrogenolysis temperature. This effect was absent in the case of ethane and propane at their respective hydrogenolysis temperatures. A peculiar discontinuity in the cyclopropane Arrhenius plot was attributed to cyclopropane adsorption in the zeolite. 21 references, 6 figures, 2 tables.

31321 (INIS-mf—8968, pp 72-78) **Electron transport in liquids: effect of unbalancing the methane molecule by deuteration.** Floriano, M.A.; Freeman, G.R. (Alberta Univ., Edmonton (Canada). Dept. of Chemistry). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The mobility of electrons in nonpolar liquids is strongly dependent on the molecular shape. In spherelike methane the mobility is three orders of magnitude greater than in the rodlike ethane. To investigate the enormous gap between methane and ethane, the effect of slightly perturbing the symmetry of the methane molecule by progressive deuterium substitution was studied. At temperatures near the triple point (T/Tsub(c) approximately 0.48) and near the mobility maximum (T/Tsub(c) approximately 0.93) the mobilities change in the order: $CH_4 > CH_3D > CH_2D_2 < CHD_3$ approxi-

mately CD_4. The differences are related to the symmetries of the molecules and to the rotational motions.

31322 **(IS-T—1111(Rev.1)) Characterization and chemistry of vinylketene prepared by flash vacuum pyrolysis. Study of the flash vacuum pyrolysis of hydroaromatic compounds: 5,8-diphenyltetralin and the parent and substituted 5,6,11,12-tetrahydrodibenzo[a,e]cyclooctenes. Revision 1.** Surber, B.W. (Iowa State Univ. of Science and Technology, Ames (USA). Dept. of Chemistry). 1984. Contract W-7405-ENG-82. 180p. NTIS, PC A09/MF A01; GPO Dep. Order Number DE84011487.

Thesis.

In Part I, benzocyclobutene (9) and its [4+4] dimer, 1,5-dibenzocyclooctadiene (14) were found to give anthracene (7) as a major product. The similarity of the product mixtures is taken as evidence that essentially the same mechanism is operating in both cases. By labeling studies, the [4+2] spirodimer (14') appears to be an intermediate. The fragmentation by which 14' is thought to give 7 is new and analogous to the retroene reaction. In Part II, vinylketene (66), prepared by FVP, was characterized by low-temperature ^1H- and ^{13}C-NMR spectroscopy. It was found to dimerize by a novel [4+2] cyclo-addition reaction. The resulting δ-lactone (90) was isomerized to a mixture of sibirinone (91) and 6-allyl-α-pyrone (92). Acid-catalyzed isomerization gave primarily 91 (9:1 mole ratio). When vinylketene was mixed with cyclopentadiene, the [2 + 2] cycloadduct (72) was formed with high regio- and stereospecificity. Compound 72 was isomerized to bicyclo[4.2.1]nona-3,7-dien-2-one (97). Part III described an attempt to determine the effect of surface catalysis in FVP. The synthesis of 5,8-diphenyltetralin (9) was described. Comparison of the pyrolysis of 9 to that of the parent compound, tetralin (1) was not possible since the thermal chemistry of 9 was found to be too different from that of 1. The major product of the pyrolysis of 9 at 1000°C and 10^{-5} torr was due to the loss of C_2H_6 while 1 gave styrene as the major product by the loss of C_2H_4 under similar conditions.

31323 **(PB—84-147362) Reports of the Asahi Glass Foundation for Industrial Technology. Volume 43, 1983.** (Asahi Glass Foundation for Industrial Technology, Tokyo (Japan)). 1983. 207p. NTIS, PC E10/MF E01.

Text in Japanese with English Abstracts; See also PB83-264838.

The Foundation is an independent organization which donates funds for university professors to conduct research. Research reports are published biannually. This volume contains: Electrokinetic Detector for High-Performance Liquid Chromotography; Preparation of Graphite Fluorides by a Vertical Fluorination Reactor with Vibrator; Synthesis of Fluorine Containing Fine Chemicals from Fluoroolefins; Fourier Transform Infrared Photoacoustic Spectroscopy of Polymer Films and Organic Coatings on Metal Substrate; Effect of Ad-atoms on Oxygen Reduction on Platinum Electrodes; Synthesis of Functionalized Crown Ethers and Evaluation of Their Characteristics for of Ions Separation; Polymer Coated Electrodes; Mass Transport Characteristics in a Hot-wall Type Chemical Vapor Deposition Reactor; Basic Study on Immobilized Enzyme Reactor, and other titles.

31324 **(TRI-PP—83-2) Rapid stereoselective synthesis of fluorinated carbohydrates. Addition of acetyl hypofluorite to vinyl ether derivatives of sugars.** Adam, M.J.; Neeser, J-R.; Hall, L.D.; Pate, B.D. (TRIUMF, Vancouver, British Columbia (Canada)). Jan 1983. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701831.

Acetyl hypofluorite has been added to six unsaturated carbohydrates which contain the vinyl ether moiety. All reactions were rapid (less than 5 min.) at -78 degrees C and gave, with one exception, high yields of isomerically pure products. The hypofluorite was shown to add exclusively in a cis mode and with a strong preference for a particular 'face' of the double bond. As well as the syntheses, NMR data and preferred conformations for the fluorinated products are also discussed.

4004 Electrochemistry

31325 **(PB—84-152719) Cation exchange pretreatment studies for high recovery - Yuma desalting plant.** Kaakinen, J.W.; Laverty, P.E. (Bureau of Reclamation, Denver, CO (USA). Engineering and Research Center). Oct 1983. 304p. (REC-ERC—82-11). NTIS, PC A14/MF A01.

The main purpose of the High Recovery Test Program was to obtain feasibility design data for cation exchange softening to allow a greater fractional recovery of desalted product water at the YDP(Yuma Desalting Plant). Compared to the original YDP design with 70-percent desalting recovery, additional removal of calcium in the desalting feed would allow recoveries over 90 percent. Pilot plant equipment to test this process was operated at the YDTF(Yuma Desalting Test Facility) and consisted of an IX unit and an electrodialyzer to supply reject-brine regenerant for the IX experiments. Gypsum scale buildup in the resin bed could be avoided by regeneration with a high upward flow rate causing a fluidized bed. Reuse of regenerant was also beneficial. Results show that the ion exchange high recovery pretreatment process is highly feasible, and that it is technically possible to achieve high recovery in the YDP. Numerous recommendations for a plant design are given and future studies are noted.

4005 Photochemistry

REFER ALSO TO CITATION(S) 30438, 32280

31326 **(AD-A—136648/3) Experimental studies in molecular fragmentation: processes, energetics and diagnostics. Annual report No. 1, 1 Jan-31 Dec 83.** Kohl, J.L. (Smithsonian Astrophysical Observatory, Cambridge, MA (USA)). Dec 1983. 7p. NTIS, PC A02/MF A01.

Experiments leading toward measurements of the photodestruction of nitromethane have been initiated. Photodissociation of H_2 has been observed and preliminary experiments on the photodetachment and photodissociation of CH have been carried out. The absorption spectrum of nitromethane in the wavelength range 350 to 190 nm has been measured with 0.001 nm resolution. A feasibility study of induced fluorescence experiments to determine the spectra of polyatomic free radicals has been carried out. An improved detector system has been installed in the apparatus and performance tests are underway.

31327 **(AD-A—136991/7) Photochemical conversion of $H_2Os_3(CO)_{10}$(p-donor) to $H_2Os_3(CO)_9$(p-donor) in solution and on high surface area silica. Interim technical report.** Bentsen, J.G.; Wrighton, M.S. (Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Chemistry). 28 Dec 1983. 18p. (TR—40-ONR). NTIS, PC A02/MF A01.

Near-uv irradiation of $H_2Os_3(CO)_{10}L$ yields conversion to the known coordinatively unsaturated $H_2Os_3(CO)_9L$ for L = PPh3 or PPh2Et in alkane solution at 298 K. Likewise, near-uv irradiation of an alkane suspension of (SiO_2)-L'$Os_3(CO)_{10}H_2$ yields (SiO_2)-L'$Os_3(CO)_9H_2$ where (SiO_2)-L'$Os_3(CO)_{10}H_2$ is the solid prepared by reaction of high surface area SiO_2 with $H_2Os_3(CO)_{10}$-($PPh_2CH_2CH_2Si(OEt)_3$). The same photochemistry results at 77 K in rigid alkane glasses, but the initial (less than 5% conversion) product is not derived from loss of CO. Continued irradiation at 77 K yields $H_2Os_3(CO)_8L$ and CO, but $H_2Os_3(CO)_9L$ is only found in approx. 50% yield based on the amount of $H_2Os_3(CO)_{10}L$ consumed. Warming the irradiated sample to 298 K yields some regeneration of $H_2Os_3(CO)_{10}L$ and some additional $H_2Os_3(CO)_9L$.

31328 **(DOE/ER/13023—1) Investigations on multiphoton ionization and fast-beam photodissociation spectroscopy. Progress report.** (Texas A and M Univ., College Station (USA). Dept. of Chemistry). 1984. Contract AS05-82ER13023. 14p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011505.

Studies on 2,4-hexadiyne $C_6H_6^+$ radical were performed to evaluate the photodissociation apparatus. These studies are being extended to 1,3-hexadiyne and dimethylena cyclobutene $C_6H_6^+$ ions. The $C_4H_4^+$ ion formed by fragmentation of benzene, etc. was

also investigated. Studies are underway on the propargyl halide systems and systems containing the butadiene chromaphone. Isomerization is considered.

31329 **Excitation spectrum of the chemical reaction F_2/O_2 in the red spectral range.** Frei, H. (Laboratory of Chemical Biodynamics, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Journal of Chemical Physics;* **80**: No. 11, 5616-5622(1 Jun 1984).

A search has been made for new, low-energy pathways of the reaction $F_2+O_2 \rightarrow O_2F+F$ or O_2F_2 through excitation of F_2 or O_2 in an oxygen matrix with red and near infrared photons. By monitoring the product yield as a function of laser irradiation frequency, a reaction excitation spectrum of O_2+F_2 was recorded which begins at 14 500 cm^{-1} and extends through the entire red spectral range. It revealed two discrete absorptions O_2 $^1\Sigma^+$/sub g/, $v' = 1 \leftarrow {}^3\Sigma^-$/sub g/, $v'' = 0$ and $(O_2)_2(^1\Delta$/sub g/,$^1\Delta$/sub g/)0,0 $\leftarrow(^3\Sigma^-$/sub g/, $^3\Sigma^-$/sub g/)0,0, and a continuous, oxygen-enhanced absorption of F_2 which is assigned to excitation to the repulsive part of the weakly bound $^3Pi_0+$/sub u/ state. The F_2 absorption detected in this experiment extends more than 200 nm to longer wavelengths than any electronic absorption of molecular fluorine reported so far.

4006 Radiation Chemistry

REFER ALSO TO CITATION(S) 31243

31330 **(AECL—7692) Progress report: Chemistry and Materials Division, 1982 January 1 to March 31.** (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jun 1982. 97p. (PR-CMa—60). NTIS (US Sales Only), PC A05/MF A01. Order Number DE84701913.

Solid state studies in this period included observations of annealing of irradiation damage in Ni-In and Al-Sn alloys. Extensive experiments on the radiation chemistry of nitrogen-oxygen mixtures have been completed enabling comparisons to be made with calculations based on physical data. The program MAKSIMA-CHEMIST has been used to calculate the effects of variables such as concentration of dissolved gases on the accuracy of water calorimeters. Work in laser photochemistry continued with measurement of the infrared spectra of methylamine with and without deuterium substituted for the amino-hydrogens. Spectroscopic data for chemical species involved in laser isotope separation processes are being taken by laser magnetic resonance spectroscopy Improvements in detection of anions separated on columns of styrenedivinylbenzene with hydrophobic modifiers have been achieved by use of conductivity detection in place of ultraviolet absorption. The accuracy of the inert gas fusion method for measuring hydrogen in zirconium was verified. Research on zirconium alloys continued with work on gaseous hydrogen cracking, metal vapor embrittlement, nodular corrosion, and irradiation with helium ions at elevated temperatures.

31331 **(AECL—7834) Radiation chemistry of water at low dose rates with emphasis on the energy balance. A computer study.** Fletcher, J.W. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Sep 1982. 60p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701832.

There has been considerable interest in absorbed dose water calorimetry. In order to accurately relate the temperature change to the absorbed dose, the energy balance of the overall chemistry of the system must be known. The radiolytic products and their yields are affected by dose rate, dose and added solutes. The yields of the radiolytic products have been calculated using a computer program developed at Atomic Energy of Canada. The chemical energy balance was determined as a function of dose for various dose rates and initial concentrations of hydrogen (H_2), oxygen (O_2), and hydrogen peroxide (H_2O_2). In solutions containing H_2O_2 or O_2 and H_2 the chemical reactions were exothermic; in other cases they were endothermic. Approach to equilibrium and equilbrium conditions are discussed.

31332 (DOE/ER/60142—1, pp 105-114) **Computational details of the Monte Carlo simulation of proton and electron tracks.** Zaider, M. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

In this report the treatment of elastic angular scattering of electrons as utilized in PROTON is described and compared with alternate formalisms. The sensitivity of the calculation to different treatments of this process is further examined in terms of proximity functions of energy deposition. 20 references, 5 figures.

31333 (DOE/ER/60142—1, pp 115-130) **Calculations of microdosimetric quantities.** Zaider, M. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Track structure calculations are clearly of great utility and perhaps are necessary for the elucidation of the mechanisms of radiation damage to cellular systems, however users should exercise caution with such calculations and should be sensitive to their current uncertainties. This report presents calculations of quantities that are not directly amenable to experiment, i.e., lineal energy distributions, proximity functions of energy transfer, radial dose distributions. Particularly at the nanometer level, which appears to be critical for radiobiology, analytic approaches do not yield accurate results, and the calculations appear sensitive to effects such as inclusion/exclusion of nonionizing energy transfer events. 15 references, 7 figures.

31334 **(EGG-TMI—6489) EPICOR-II resin characterization and proposed methods for degradation analysis.** Doyle, J.D.; McConnell, J.W.; Sanders, R.D. (EG and G Idaho, Inc., Idaho Falls (USA)). Dec 1983. Contract AC07-76ID01570. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012170.

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One goal of the EPICOR-II Resin/Liner Research is the examination of the EPICOR-II organic ion-exchange resins for physical and chemical degradation. This report summarizes preliminary information necessary for the evaluation of the resins for degradation. The information is presented in two sections. First, a description is given of the physical and chemical characterization of unirradiated EPICOR resins obtained from EPICOR Inc. Second, the plan by which internally irradiated EPICOR resins from TMI will be examined for degradation is briefly described.

31335 (INIS-mf—8962, pp H12) **Pyrocatecholate complexing of trivalent actinides.** Lundqvist, R. (Chalmers Tekniska Hoegskola, Goeteborg (Sweden). Institutionen foer Kaernkemi); Strezov, A. (Bylgarska Akademiya na Naukite, Sofia. Inst. za Yadrena Izsledvaniya i Yadrena Energetika). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31336 **(TRI-PP—82-55) Electron reactions with thiosulphate ions at various ionic strengths.** Buxton, G.V.; Walker, D.C. (TRIUMF, Vancouver, British Columbia (Canada)). Dec 1982. 5p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701778.

The previously published rate constants for the reaction of hydrated electrons with $S_2O_3^{2-}$ vary by a factor of 24 and are all found to be significantly different from the value measured in this work, (1.01 +- 0.04) x 10^8 dm^3 mol^{-1} s^{-1}, corrected to zero ionic strength. No difference was observed for the bimolecular reaction rate whether the ion atmospheres were composed of the reactive solute or mainly of a neutral salt added in large excess. For approximately 0.1 mol dm^{-3} solutions of $S_2O_3^{2-}$ the end-of-pulse yield of e sub(aq) was found to be the same as for 10^{-3} mol dm^{-3} H sub(aq)sup(+), indicating that $S_2O_3^{2-}$ does not scavenge presolvated electrons at that concentration. Such solutions, therefore, could not inhibit muonium formation in spurs, and thus they provide a background against which to test models of muonium formation.

31337 (ZfI-Mitt—71, pp 332-346) **Radiation degradation polypropylene molecular weight and melt viscosity change.** Babic, D.; Safranj, A.; Markovic, V. (Institut za Nuklearne Nauke Boris Kidric, Belgrade (Yugoslavia)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Isotactic polypropylene is widely used for production of disposable syringes and for some other single-use medical products. Under irradiation the yield of scission is significantly greater than the yield of cross-linking, resulting in a deterioration of mechanical properties. In addition a slow process of chain autooxidative degradation, following irradiation, usually takes place. Two commercial resins and an additive-free isotactic polypropylene were used for studies in this work. The molecular weight distribution has been measured at high pressure by high temperature liquid chromatography, in order to determine the immediate effect of radiation degradation. This was accompanied by melt viscosity measurements. The data obtained are useful to predict the short and long-term mechanical properties of polypropylene made products, sterilized by ionizing radiation.

4007 Radiochemistry And Nuclear Chemistry

REFER ALSO TO CITATION(S) 30331, 31182, 31187, 31228, 31229, 31230

31338 **(AERE-R—10506) Electrochemical decontamination of Pu contaminated stainless steel.** Turner, A.D.; Pottinger, J.S.; Junkison, A.R. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.). Aug 1983. 56p. (DOE/RW—83.089). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701715.

Electrochemical decontamination has been demonstrated to be very effective in removing plutonium nitrate contamination (0.5 $\mu g\ cm^{-2}$) on stainless steels. The amount of metal dissolved to achieve a DF of 10^2 to 10^3 was 2 to 7 μm depending on the electrolyte used. In unstirred electrolytes 1M HNO_3, 1M HNO_3/0.1M NaF, 5M HNO_3 perform best. Under stirred electrolyte conditions, there is a general marginal fall in effectiveness except for 5M HNO_3 where there is a slight improvement. The optimum performance is a compromise between maximizing the electrolyte throwing power and minimizing substrate surface roughening during decontamination.

31339 (INIS-mf—8962, pp A2) **Recent applications of the relativistically parameterized extended Huckel method (REX) on actinide compounds.** Pyykkoe, P. (Helsinki Univ. (Finland). Dept. of Chemistry). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31340 (INIS-mf—8962, pp A4) **Ceriumlike behaviour of plutonium.** Cooper, B.R. (West Virginia Univ., Morgantown (USA). Dept. of Physics). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31341 (INIS-mf—8962, pp D3) **Pseudotetrahedral versus related trigonal bipyramidal organouranium (IV) - complexes. Interrelations of molecular and electronic structure.** Fischer, R.D.; Yuenlue, K.; Jahn, W.; Amberger, H.D. (Hamburg Univ. (Germany, F.R.)); Kanellakopulos, B. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31342 (INIS-mf—8962, pp H1) **Crystal field models for the interpretation of the magnetic properties of some U and Np tetragonal compounds.** Amoretti, G.; Blaise, A.; Fournier, J.M. (CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31343 (INIS-mf—8962, pp G1) **X-ray diffraction study of californium metal to 16 GPa.** Peterson, J.R. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Heisse Chemie); Benedict, U.; Dufour, C.; Birkel, I. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements); Haire, R.G. (Oak Ridge National Lab., TN (USA)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31344 (INIS-mf—8962, pp H4) **Crystal structure and electrical resistivity of some neptunium ternary compounds NpAsY (Y = S, Se, Te).** Wojakowski, A. (Polska Akademia Nauk, Wroclaw. Inst. Niskich Temperatur i Badan Strukturalnych; CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Genie Radioactif). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31345 (INIS-mf—8962, pp H5) **Synthesis and Moessbauer studies of carnotite-type compounds $M_2(NpO_2)_2V_2O_8$, (M = K, Rb, Tl).** Yang, H.X.; Tabuteau, A.; Jove, J.; Thevenin, T.; Pages, M. (Institut Curie, Section de Physique et Chimie, Equipe Physico-Chimie des Transuraniens (ERA CNRS), Paris (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31346 (INIS-mf—8962, pp H6) **Structural study of neptunyl (NpO_2^+) complex with mellitic acid.** Cousson, A.; Nectoux, F.; Dabos, S.; Pages, M. (Institut Curie, Section de Physique et Chimie, Equipe Physico-Chimie des Transuraniens (ERA CNRS), Paris (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31347 (INIS-mf—8962, pp J3) **Heat capacity of UP-USe solid solutions.** Gordon, J.E. (Amherst Coll., MA (USA). Dept. of Physics); Blaise, A.; Lagnier, R. (CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)); Mortimer, M. (UKAEA Atomic Energy Research Establishment, Harwell. Chemistry Div.); Troc, R. (5258200PL). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31348 (INIS-mf—8962, pp J4) **Low temperature heat capacity of rocksalt uranium monopnictides.** Troc, R.; Madge, H. (International Laboratory of High Magnetic Fields and Low Temperatures, Wroclaw (Poland)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31349 (INIS-mf—8962, pp B1) **Magnetism of californium metal.** Huray, P.G. (Tennessee Univ., Knoxville (USA). Dept. of Physics; Oak Ridge National Lab., TN (USA)); Nave, S.E. (Tennessee Univ., Knoxville (USA). Dept. of Physics); Haire, R.G. (Oak Ridge National Lab., TN (USA)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31350 (INIS-mf—8962, pp C1) **^{239}Pu Dsub(2.25) neutron powder diffraction study.** Bartscher, W.; Manes, L.; Rebizant, J.; Ward, J.W. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements); Boeuf, A. (Commission of the European Communities, Ispra (Italy). Joint Research Centre; Institut Max von Laue - Paul Langevin, 38 - Grenoble (France)); Caciuffo, R. (Ancona Univ. (Italy). Facolta di Ingegneria); Fournier, J.M. (CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France). Dept. de Recherche Fondamentale); Rustichelli, F. (Ancona Univ. (Italy). Facolta di Medicina). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31351 (INIS-mf—8962, pp D1) **Preparation and properties of some new organometallic compounds of actinides.** Goffart, J. (Liege Univ. (Belgium)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31352 (INIS-mf—8962, pp D2) **Reactivity of M(NEt$_2$)$_4$ towards cyclopentadiene. Synthesis, characterization and reactivity of some MCpsub(n)(NEt$_2$)sub(4-n) (M = U(IV)) and Th(IV).** Paolucci, G.; Zanella, P.; Rossetto, G. (Consiglio Nazionale delle Ricerche, Padua (Italy). Lab. di Chimica e Tecnologia dei Radioelementi); Fischer, R.D. (Hamburg Univ. (Germany, F.R.)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31353 (INIS-mf—8962, pp E4) **Transport processes of actinides in aqueous and nonaqueous solutions.** Marx, G.; Arndt, F.; Binder, C.; Bischoff, H.; Feldner, K.H.; Friehmelt, V.; Roesel, B. (Freie Univ. Berlin (Germany, F.R.). Inst. fuer Anorganische und Analytische Chemie). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31354 (INIS-mf—8962, pp F1) **Structural chemistry of thorium compounds with coordination numbers 7, 8, 9 and 10.** Bombieri, G. (Messina Univ. (Italy)); Benetollo, F.; Tomat, G. (Consiglio Nazionale delle Ricerche, Padua (Italy). Lab. di Chimica e Tecnologia dei Radioelementi); Del Pra, A. (Milan Univ. (Italy)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31355 (INIS-mf—8962, pp F2) **Uranium mobility in the solid state. The first step.** Noel, H. (Univ. de Rennes-Beaulieu, Laboratoire de Chimie Minerale B, Laboratoire Associe au C.N.R.S. (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31356 (INIS-mf—8962, pp F4) **Crystal growth of plutonium monopnictides.** Rebizant, J.; Rijkeboer, C.; Spirlet, J.C. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements); Mattenberger, K.; Vogt, O. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31357 (INIS-mf—8962, pp H13) **Red fluorescence of U^{4+} in the incommensurate phase of ThCl$_4$.** Krupa, J.C.; Khan Malek, C. (Laboratoire de Radiochimie, Institut de Physique Nucleaire, Orsay (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31358 (INIS-mf—8962, pp E1) **Limit diffusion coefficients and hydration (numbers) of some trivalent actinide and lanthanide ions.** Fourest, B.; Duplessis, J.; David, F. (Laboratoire de Radiochimie, Institut de Physique Nucleaire, Orsay (France)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31359 (INIS-mf—8962, pp E2) **Uranium III and IV borohydrides in solution. Applied synthesis of new uranium III compounds.** Ban, B.; Dejean-Meyer, A.; Fazakerley, V.; Folcher, G.; Marquet-Ellis, H. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Physico-Chimie). 1983. (In French). NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31360 (INIS-mf—8962, pp H9) **Oxidation effects of hydrogen peroxide catalyzed by photosensitized uranyl.** Folcher, G.; Paris, J.; Saito, E. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. de Physico-Chimie). 1983. (In French). NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31361 **(KFKI—1983-91) Cage effect in recoil studies.** Berei, K. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Sep 1983. 16p. (CONF-820607—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701707.

From 11. international hot atom chemistry symposium (IHAC); Davis, CA, USA (27 Jun 1982).

The role of cage effect is one of the most discussed questions of hot atom chemistry in condensed organic systems. So far no direct evidence is available for assessing the exact contribution of thermal recombinations occurring in the liquid cage to the stabilization processes of recoil atoms. However, some conclusions can be drawn from experimental observations concerning the influence on product yield of hot atom recoil spectra, the effects of density, phase and long range order of the medium as well as from comparisons with systems providing cage walls of different chemical reactivities towards the recoil atom. Recent developments in this field are reviewed based primarily on the investigations of recoil halogen reactions in aliphatic and aromatic hydrocarbons and their haloderivatives.

4008 Combustion, Pyrolysis, And High-temperature Chemistry

REFER ALSO TO CITATION(S) 30470

31362 **(LBL—17487) Molecular beam sampling of transient combustion.** Lucas, D.; Peterson, R.; Brown, N.J.; Hurlbut, F.C.; Oppenheim, A.K. (Lawrence Berkeley Lab., CA (USA); California Univ., Davis (USA). Dept. of Mechanical Engineering). Apr 1984. Contract AC03-76SF00098. 11p. (CONF-8404123—4). NTIS, PC A02; 3; GPO Dep. Order Number DE84012054.

From 2. symposium on energy engineering sciences; Argonne, IL, USA (10 Apr 1984).

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Transient combustion has been studied with a molecular beam mass spectrometer. The molecular beam has been fully characterized using time-of-flight measurements for the entire range of temperatures and pressures encountered during combustion flash-ignited mixtures of $CH_4/O_2/NO_2/Ar$. Temperature profiles of reacting mixtures are measured, and indicate that there are no significant perturbations of a homogeneous gas mixture due to the sampling technique. Mass signals are recorded and presented with a time resolution of ~ 100 μs. Beam overrun, due to the hotter, and thus faster, constituents of the molecular beam formed later than the colder and slower portions, is quantified using a numerical technique developed for this purpose.

31363 **(SAND—84-0169-Vol.8-No.1) Sandia technology. Vol. 8, No. 1.** (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 35p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012270.

Research programs of Sandia National laboratories are presented for the following areas: (1) combustion; (2) borehole fracturing technique to improve gas production; and (3) hydrogen effects in fusion reactor walls. All three papers have been processed for inclusion in the Energy Data Base.

31364 (SAND—84-0169-Vol.8-No.1, pp 2-17) **New light on combustion research.** May 1984. NTIS, PC A03/MF A01. Order Number TI84012270. Contract AC04-76DP00789.

In Sandia technology. Vol. 8, No. 1.

This article discusses some laser diagnostic techniques that Sandia National Laboratories and other laboratories throughout the world have developed for specific combustion applications. Results obtained with these new techniques are used to verify or modify the computer-based analytic models that are basic tools for improving our understanding of important combustion processes. CARS, coherent anti-Stokes Raman scattering, is one of the newer laser technique. Two pump laser beams (green) and a Stokes laser beam (red) are used to generate the CARS laser beam (blue) within the combustion environment. The CARS beam is then analyzed for diagnostic information. 21 figures, 1 table.

42 ENGINEERING

4201 General Engineering

31365 **(DOE/ER/10556—98) Comparison of methods for calculating energy release rates.** Li, F.Z.; Shih, C.F.; Needleman, A. (Brown Univ., Providence, RI (USA). Div. of Engineering). Feb 1984. Contract AC02-80ER10556. 44p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012231.

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We compare two methods for calculating the energy released during quasi-static crack advance. One method is based on a surface integral (line integral in two dimensions) expression for the energy release rate, while the other method is based on a volume (area) integral representation. A concise derivation of the volume (area) integral expression is given using a virtual work type identity for Eshelby's energy momentum tensor. The finite element implementation of the volume (area) integral formulation corresponds to the virtual crack extension method. Within the context of this formulation we outline a procedure for calculating pointwise values of the energy release rate along a three dimensional crack front. For illustrative purposes, numerical examples are presented for a fully plastic plane strain edge-cracked panel subject to combined tension and bending.

31366 **(DOE/TIC—4628) Engineering materials: a bibliography.** Kinser, W.H. (ed.). (USDOE Technical Information Center, Oak Ridge, TN). Jun 1982. 57p. NTIS, PC A04/MF A01. Order Number DE82014444.

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The Department of Energy and its predecessor agencies have endeavored, through the Technical Information Center (TIC), to assure that technological innovations resulting from agency-sponsored research and development work receive the widest possible industrial use. One of the means employed to reach this goal is the Engineering Materials Program, which makes available to the public such informational tools as drawings, specifications, design criteria, flow sheets, parts lists, bills of materials, photographs, maps, etc., that are associated with equipment, instruments, processes, and facilities developed or investigated by agency contractors. This bibliography provides abstracting and indexing coverage of the engineering materials packages that are included in the DOE Energy Data Base. The literature is arranged by category as shown in the table of contents. Indexes are provided for the corporate authors, subjects, and CAPE report numbers (assigned by TIC).

31367 **(EGG-M—08584) New techniques for adjusting reference factors.** Wilson, C.J. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 9p. (CONF-8405172—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012649.

From International Society of Parametric Analysts conference; San Francisco, CA, USA (13 May 1984).

Availability of analogous historical data is important to developing realistic cost estimates with parametric methodologies. Often, however, historical data of the same character and functional capability are not available; they have not or cannot be collected, or the cost problem is first of a kind. A serious problem has existed, therefore, for traditional, historically-data-bound, parametric techniques. Either the technique cannot be used at all, or adjustments to algorithms and reference data are complicated and unreliable. The FAST (Freiman Analysis of Systems Technique) parametric models developed by Frank Freiman have the unique feature of being linearly adjustable. This feature greatly facilitates the synthesis of historical data for use as references in new situations. Linearity emulates designers' and managers' cost change perceptions. In addition, it is relatively easy for an engineer to express change from a known design to a new one in linear terms, i.e., 25 percent less complex, 50 percent more complex, etc. In all of the FAST models, this linear adjustment can be applied to account for change in the following complexities: production, engineering, installation, integration, schedule, construction, site work, utilities, and mining.

31368 **(LA-UR—84-1526) Perception of graphic system data base problems and needs from a numerical control programmer's viewpoint.** Maier, O.A. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 21p. (CONF-8405145—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012635.

From IMOG/NSG meeting; Tampa, FL, USA (15 May 1984).

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Some needs addressed concerning computer-aided design and computer-aided manufacture include: data base definition rules and three-dimensional data bases; inclusion of concise dimensional, finishing, and other data in textual or attribute form; usable solid modeling capability; better toolpath control; programmable language section of system capable of addressing the whole system data structure; and broader numerical control macro capability. (LEW)

31369 **(UCRL—90833) Single point diamond crushing of glass.** Bryan, J.B.; Carter, D.L.; Clouser, R.W.; Thompson, S.L. (Lawrence Livermore National Lab., CA (USA)). 23 May 1984. Contract W-7405-ENG-48. 22p. (CONF-8406122—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012570.

From Precision machining workshop, Society of Manufacturing Engineers; Berkeley, CA, USA (5 Jun 1984).

Single point diamond crushing of glass was originally developed by Dr. R.E. Reason of Taylor and Hobson in England 34 years ago as a means of shaping glass aspheres prior to polishing. It has recently been tried at LLNL. A surface finish of 50 microinches peak-to-valley with occasional deeper pits has been achieved on Zerodur and BK-7 glass. A depth of cut of 0.008 inch or more can be taken at a surface speed of 900 feet per minute. Tool wear is on the order of 10 microinches after removal of one cubic inch of Zerodur. The tool's cost is $5.45 each.

4202 Facilities And Equipment

REFER ALSO TO CITATION(S) 30192, 30198, 30201, 30202, 30203, 30204, 30205, 30207, 30209, 30220, 30649, 30970, 31216, 31452, 31478, 31508, 31550, 31589, 31629, 31977, 32367, 32369

31370 **(BMFT-FB-HA—83-032) Air-conditioning, ergonomical and safe design of engineers cabins of Diesel locomotives in hard coal mining.** Schlueter, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Dec 1983. 42p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84751256.

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The mini-refrigeration unit developed within the scope of this research project allows a reduction of the high temperatures prevailing in the conductor cabins of underground Diesel locos. Considering the ever increasing depths of coal mining activities and the deterioration of working climates involved, such cooling means are gaining importance. Together with the development of an ergonomical and safe driver's cabin this project contributes to an improvement of working environments as well as to the health and job performance of diesel loco engineers. Development work was implemented both with more recent and older Diesel locos being used underground. The work was completed by operational studies and medical examinations.

31371 **(CONF-830491—2) Electric motors and controls for intelligent machines.** Meystel, A. (Florida Univ., Gainesville (USA). Dept. of Electrical Engineering). 1983. Contract AC05-79ER10013. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012879.

From PCI/MOTORCON 83 conference; Orlando, FL, USA (19 Apr 1983).

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The situation in industry in the present time poses a variety of new problems for manufacturers and researchers of electric motors and controls. The nature of these new problems determine the appearance of new approaches to design and control related to productivity, accuracy, diversification, complexity and need in autonomous systems. These problems can be solved in the framework of a cooperative interrelated research and industrial coordinated effort. This report reviews some of the situations which industry faces in dealing with robotic application of electric motors.

31372 **(CONF-830491—4) Antagonistic control of dc motors: a theoretical and experimental study.** Meystel, A.; Phadke, J.; Roberts, M. (Florida Univ., Gainesville (USA). Dept. of Electrical Engineering). 1983. Contract AC05-79ER10013. 12p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012882.

From PCI/MOTORCON 83 conference; Orlando, FL, USA (19 Apr 1983).

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Conclusions and suggestions are made on the basis of theoretical and experimental analysis of the transistor based dc electric motor control system with pulse-width modulated ANTC. A convenient technique of control with a short circuit feature of a transistor based H bridge was introduced. This technique is especially useful when the recuperation of energy from the motor to the voltage supply is not possible. ANTC can be realized with the interlaced positive and negative pulses of the PWM dc voltage supply connected to the armature. The state variable mathematical model of the open loop PWM controlled dc motor is proven experimentally to be close to reality and may be used in a subsequent research of a closed loop system. The open loop transient processes in the systems with conventional control and ANTC are shown to be different. The transient behavior of the motor speed under ramping of reciprocal forces in the system with ANTC is shown to be linear. The microprocessor based control structure for the system with ANTC has been developed. A test bench for a microprocessor based dc motor ANTC system has been created which may be used for the analysis of a variety of electromechanical processes. This bench includes a printed armature motor, a tachogenerator, an H bridge based on fast power transistors, and a standard microprocessor board.

31373 **(CONF-830491—5) Optical sensing systems for robotic manipulators.** Fikes, J.W.; Isik, C.; Chenette, E.R.; Meystel, A. (Florida Univ., Gainesville (USA); International Laser Systems, Inc., Orlando, FL (USA)). 1983. Contract AC05-79ER10013. 10p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012291.

From PCI/MOTORCON 83 conference; Orlando, FL, USA (19 Apr 1983).

The straightforward use of optical sensors and sensing systems can provide information essential to the feedback control of robotic manipulators; these systems can then be made electronically stiff and the position and motion of the end-effector in the work space can be predicted with precision. This paper addresses a problem of comparative analysis of practical possibilities in using vision system for a manufacturing robot. The paper presents a very brief description of several approaches which are being investigated with an outline of their limitations.

31374 **(CONF-830491—6) Range scanning peripheral for an autonomous mobile device.** McKisson, J.; Bingel, T. (Florida Univ., Gainesville (USA). Dept. of Electrical Engineering). 1983. Contract AC05-79ER10013. 6p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012885.

From PCI/MOTORCON 83 conference; Orlando, FL, USA (19 Apr 1983).

This paper describes a sensor subsystem for autonomous mobile devices (AMD) employing the Wandering Standpoint Algorithm (WSA). The operation of this algorithm is based upon the continuous scanning along the line of sight. Navigation of the path is based on the limited information of possible and desirable new standpoints as found by the scanning sensor. The judgement is made upon comparison of existing maps and new information related to points of discontinuity.

31375 **(CONF-830491—7) Optimum design of electric motor for multilink manipulator.** Choi, T.I. (Florida Univ., Gainesville (USA). Dept. of Electrical Engineering). 1983. Contract AC05-79ER10013. 8p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012881.

From PCI/MOTORCON 83 conference; Orlando, FL, USA (19 Apr 1983).

The general approach to optimum design of electric motor for multilink manipulator is addressed using hierarchical design algorithm. As a result, the design criterion is obtained; the ratio between the diameter and length of rotor which remains constant for different power ranges.

31376 **(CONF-8310160—Suppl.) 3rd DOE workshop on computer-aided engineering: viewgraph supplement.** (Lawrence Livermore National Lab., CA (USA)). 1983. Contract AC02-84PW02789. 296p. NTIS, PC A13; 3; GPO Dep. Order Number DE84007776.

From 3. DOE workshop on computer-aided engineering; Livermore, CA, USA (13 Oct 1983).

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The aims and objectives in organizing this workshop are to discuss the needs, activities, and plans for Computer-Aided Engineering within the DOE laboratories and major DOE contractors. The intent is to provide a forum for exchange of information and ideas and to foster CAE communications among DOE laboratories and contractors. It is hoped that by sharing experiences and future plans, the DOE community will be better able to identify problem areas so that research and development in CAE will be better organized, supported, and made available.

31377 **(CONF-8404158—1) Automated planning for intelligent machines in energy-related applications.** Weisbin, C.R.; de Saussure, G.; Barhen, J. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 10p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011666.

From Intellignet systems and machines conference; Rochester, MI, USA (24 Apr 1984).

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This paper discusses the current activities of the Center for Engineering Systems Advanced Research (CESAR) program relat-

ed to plan generation and execution by an intelligent machine. The system architecture for the CESAR mobile robot (named HERMIES-1) is described. The minimal cut-set approach is developed to reduce the tree search time of conventional backward chaining planning techniques. Finally, a real-time concept of an Intelligent Machine Operating System is presented in which planning and reasoning is embedded in a system for resource allocation and process management.

31378 **(DOE/ER/10013—1) Design and fabrication of a four degree-of-freedom force feedback planar manual controller.** Brown, T.D.; Matthew, G.K.; Tesar, D. (Florida Univ., Gainesville (USA). Center for Intelligent Machines and Robotics). 10 Apr 1983. Contract AC05-79ER10013. 231p. NTIS, PC A11/MF A01; 1; GPO Dep. Order Number DE84012289.

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State of the art teleoperator controllers for manipulators are represented by bilateral master-slave devices. These position forward, force-feedback devices rely on a geometric similarity between the manipulator and the controller (slave and master) and simplistic control schemes to operate. During operation, the slave replicates the master's configurations. The operator must be aware of the manipulator configurations, workspace obstacles, and the details of the ongoing task. This burden increases with the number of degrees-of-freedom. Joystick technology for teleoperator manipulators attempts to utilize machine intelligence to augment the operator and thereby reduce his efforts during manipulator control. The operator can focus his attentions to the task while the computer deals with the manipulator configurations and workspace obstacles. When the task is trivial or repetitive, the computer can take over and relieve the operator via the use of preprogrammed routines. Joysticks are geometrically dissimilar to the manipulators being controlled. This lack of geometric correspondence allows for further capabilities such as scale change for motions, motion filtering to eliminate. Force-feedback is a basic necessity for teleoperators. Through this control system the operator is tactilely aware of the loadings occurring at the manipulator. During activities in which the manipulator is lifting or twisting an object, the operator will feel a scaled force or torque. Inertialess control and obstacle encounters are other capabilities possible with force-feedback control schemes.

31379 **(DOE/ER/10013—2) Kinematic control of a robotic manipulator with a unilateral manual controller.** Lipkin, H.; Duffy, J.; Tesar, D. (Florida Univ., Gainesville (USA). Center for Intelligent Machines and Robotics). 06 May 1983. Contract AC05-79ER10013. 238p. NTIS, PC A11/MF A01; GPO Dep. Order Number DE84012447.

This study describes a teleoperator system using a six-degree-of-freedom unilateral manual controller and a robotic manipulator. The system represents a generalization of a master-slave teleoperator which is capable of performing remote tasks under direct human control. A kinematic analysis is used for positioning the manipulator end-effector. The kinematic analysis of the manipulator is performed by modeling an equivalent single loop spatial mechanism. The system software has been designed to allow the operator a significant range of choices in scaling, orientation, and resolution. The total system now operates in the laboratory at a sampling rate of 15 Hz. Given a more modern high speed computer and a more compatible language, the sampling rate is estimated to be feasible at 100 Hz.

31380 **(DOE/ER/10013—T1) Choice of target data in optimum design of electrical motors.** Meystel, A.; Choi, T. (Florida Univ., Gainesville (USA). Dept. of Electrical Engineering). 1982. Contract AC05-79ER10013. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012883.

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Analysis of specifications and other technical data of electrical motors manufactured in the US implies substantial dependence between principles of the motor and its configuration on one side, and the motor performance on the other side. This dependence varies with the manufacturer, rated speed and voltage and the interval of rated power under consideration. Not only this dependence does contain design recommendations, but it stimulates research dedicated to find the preferable configuration for the accepted cost-function. Initial results of such a research are obtained in the University of Florida. The comparative analysis of Electric Motor Data Base information and a new computer-aided design procedure is presented in this paper.

31381 **(DOE/ER/10013—T2) Force and optical position sensors: limitations of sensors and sensing systems in robotic applications.** Isik, C.; Chenette, E.R. (Florida Univ., Gainesville (USA). Center for Intelligent Machines and Robotics). 1982. Contract AC05-79ER10013. 43p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012290.

Sensory feedback as an element of intelligent control, and force sensing and visual sensing within a hierarchical sensor-controller system are discussed. A six-component force sensor designed and developed in CIMAR laboratories is the main issue of this paper. Its single beam mechanical structure is described and signal processing and conditioning circuitry is explained. Basic limitations of force measurement using strain gages are studied and related design criteria suggested. The second part of the paper deals with different optical distance measurement techniques, and concentrates on the conceptual designs of two innovative methods which utilize triangulation, laser interferometry, and pulse width modulated light beams. Some basic limitation analysis and a tentative work plan are also included in this part of the paper.

31382 **(DOE/ET/29246—T2) Variable-speed constant-voltage constant-frequency alternator. Final report.** Grannemann, W.W.; Seo, P.H.; Yang, C. (New Mexico Univ., Albuquerque (USA). Dept. of Electrical Engineering and Computer Science). Jan 1982. Contract AC01-79ET29246. 108p. NTIS, PC A06/MF A01; GPO Dep. Order Number DE84007558.

We have achieved the objective of constructing an improved second prototype alternator with digital control of its output frequency for a variable shaft speed, such as a wind machine would have. System parts have been individually tested, and the fundamental principles have been tested and proven to work. The first machine is a two-pole alternator with power removed from the rotor through slip rings. It is a single-phase output alternator. The rotating field in the stationary coil (stator) is controlled by the micro-switching circuits. The control microswitching sytem consists of TTL circuitry and power transistor amplifiers. The second machine is a two-pole alternator with power removed from the stator through three-phase distributed windings. Thus, it is a three-phase machine. The rotating field is fed through slip rings into the rotor coils. The power transistor amplifier switching circuit is also redesigned to allow for the reduction in the field coil winding.

31383 **(DOE/METC—84-17) Deposition and corrosion in gas turbines utilizing coal or coal-derived fuel.** France, J.E.; Grimm, U.; Anderson, R.J.; Kovach, J.J. (USDOE Morgantown Energy Technology Center, WV). Apr 1984. 59p. NTIS, PC A04/MF A01; GPO Dep. Order Number DE84009290.

The coupling of modular gas turbines with an economically priced and domestically available coal-derived fuel represents an attractive option for the generation of baseload electrical power. The potential application of these dirty fuels presents a challenge to current gas turbine technology. Inorganic contaminants in coal-derived fuels are potentially responsible for three major mechanisms of degrading turbine components and efficiency. These mechanisms are deposition, corrosion, and erosion effects on hot gas path components. Of these three, deposition has been identified as the mechanism most likely to limit the application of dirty fuels. This is not to suggest that corrosion or erosion are not worthy of consideration, but that deposition is considered to be less resolvable at the present. The objective of this report is to provide a survey of the literature on deposition, corrosion, and erosion phenomena in the context of the use of coal in fueling open-cycle gas turbines. The effect of coal ash on deposition and corrosion is also reviewed. The potentials of blade cooling techniques to ameliorate deposition are summarized. The inorganic impurities in minimally cleaned coal gas are taken to be similar if not identical to coal ash since the particulate in minimally cleaned coal gas is generally coal fines (perhaps devolatilized) that escape collection by the gas cleaning devices. From this survey

an appreciation of the factors and mechanisms behind deposition, corrosion, and erosion should be gained which can then be used to guide studies in controlling these effects.

31384 **(DOE/NE/44185—T1) Report for 1981 and 1982, US National Committee on Tunneling Technology.** (National Research Council, Washington, DC (USA). Commission on Engineering and Technical Systems). 1983. Contract AI01-82NE44185. 91p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84011206.

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The US National Committee on Tunneling Technology (USNC/TT), a unit of the Commission on Engineering and Technical Systems, was formed within the National Research Council in 1972 by the presidents of the National Academy of Sciences and the National Academy of Engineering. It was formed in response to a request from the chairman of the Federal Council for Science and Technology for a U.S. focal agency to be responsible for assessment of tunneling activities, and where appropriate, for stimulation of improvements in tunneling technology.

31385 **(EPRI-EL—3083) Determination of torsional fatigue life of large turbine generator shafts. Final report.** Placek, R.J.; Williams, R.A.; Adams, S.L.; Klufas, O. (General Electric Co., Schenectady, NY (USA). Large Steam Turbine-Generator Dept.). Apr 1984. 262p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920313.

This report presents the results of a study to develop a methodology for predicting torsional fatigue damage to a turbine generator rotor subjected to transient electrical disturbances. This methodology used torsional properties obtained from constant amplitude tests on one-inch diameter specimens. The predictions were verified with constant amplitude and variable amplitude tests of specimens up to six inches in diameter.

31386 **(HEDL-SA—3014FP) Microprocessor enhanced real time manual control of an industrial robot.** Yount, J.A.; Phillips, R.H. (Hanford Engineering Development Lab., Richland, WA (USA); Illinois Univ., Chicago (USA)). 14 Sep 1983. Contract AC06-76FF02170. 12p. (CONF-8406126—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011805.

From Robots conference; Detroit, MI, USA (4 Jun 1984).

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Remote handling using commercial robotic devices can be a viable approach for manipulating hazardous materials. However, these operations can result in unforeseen situations that require interruption of a robot program, followed by manual adjustment to the path and subsequent resumption of program control. A microcomputer and precision joystick controller interfaced with the control unit of the robot provide an effective means of achieving this from a remote location. The paper will describe ongoing collaborative research between Westinghouse Hanford Company and the Robotics and Automation Laboratory of the University of Illinois at Chicago for achieving such control from a remote location. This paper discusses the approach being used to achieve real time control from a remote location and a microcomputer based system that has been constructed for a Cincinnati Milacron T3 hydraulic robot.

31387 **(HEDL-SA—3077-FP) Strategies for analytical applications and implementation of a multi-purpose laboratory robot.** Baldwin, D.L. (Hanford Engineering Development Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76FF02170. 23p. (CONF-8405161—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012379.

From LABCON west conference; Long Beach, CA, USA (8 May 1984).

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The automation of the analytical chemistry laboratory has progressed steadily in recent years and in many different directions. The relatively well-established areas of automation, such as microprocessor controlled instruments and data aquisition equipment, are generally found throughout most laboratories. This equipment is designed to automate usually one portion of a procedure or a single step of an analysis. This then leaves the entire remainder of a procedure unautomated and an area for improvement.

31388 **(IAEA-RL—107) Power conditioning accessories. Construction of a delayed drop-out relay and test of constant voltage transformers.** Keroe, E.; Kaufmann, H.; Koeck, J.; Scarpatetti, R.; Vuister, P. (International Atomic Energy Agency, Seibersdorf (Austria). Laboratories). Oct 1983. 30p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701877.

A delayed drop-out relay aimed to protect electronic measuring equipment during voltage fluctuations and power failures and transients is described. The results of a test on the performance of three resonant voltage transformers (GOULD GT 3000, CVT Isoreg 15-025 and Philips 1412/00) coupled with this relay, are presented. It is found that with this set-up, instrument malfunction and breakdown can be effectively prevented under the normal power conditions met in European countries or the USA. Under more severe conditions, usually met in the developing countries, a more careful selection has to be made; the test recommends the Philips transformer. It is also recommended that for best results the constant voltage transformers should be used at 75-80% of their rated power.

31389 (INIS-SU—212, pp 33-39) **Operating duty of condensed nitrogen cryopumps.** Kholod, Yu.V.; Yuferov, V.B. 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780224.

In General and nuclear physics.

Two regimes of operation of condensation nitrogen cryopumps are investigated, they are with preliminary overcooling of liquid nitrogen approximately up to 64 K and the subsequent pumping out of the recipient (pulsed regime) and the simultaneous pumping out of vapour of cryoagent (nitrogen) by mechanic forevacuum pump, and pumping out of the recipient by cryopump. It is shown that in the range of pressures of 100-13 kPa the pulsed regime of operation is approximately 1.5 times more effective of the second regime in the fast pumping-out of nitrogen and air. The effect of the content of non-condensed He (From 0.15 to 0.63%) in the mixture with nitrogen on the operation of nitrogen cryopump is investigated. In the range of pressures from 100 to 5 kPa depending of the content in the mixture the quickness of pumping-out decreases from 3 to 20 times. Cyclic pumping-out of air and nitrogen by nitric cryopumps, cooled solid nitrogen in the pressure range of 13-1.3 kPa is investigated. The comparison of characteristics of known constructions of nitric cryopumps and new developments is done.

31390 (INIS-SU—212, pp 40-46) **Cryopumping by liquid neon in $10^{5}..10^{-1}$ Pa range.** Batrakov, B.P.; Kravchenko, V.A.; Volkov, Yu.N. 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780224.

In General and nuclear physics.

For forevacuum cryocondensation pumps conic pumping-out elements are suggested. The range of pumping out of angles at the conic top optimum from the point of view of specific quickness. Conic pUmping-out elements with ducted and external cooling are created; the dUcted pumping-out element can serve as a module when creatipg forevacuum condensation pumps of different efficiency. Specific quicknesses of pumping-out these elements when cooling them with liquid neon are measured. It is shown that in the case of durable pumping-out in the liquid phase a considerable role is played by components of the air condensed in the solid phase. Solid condensate that appears on cryosurface is net completely removed by streaming liquid condensate and brings about the decrease in the specific quickness of pumping-out. It is shown that an appropriate choice of the method of treating the internal surface of pumping out element affect the specific quickness of pumping out. The method of treatment is suggested and experimentally tested which permits to increase the specific fastness of pumping out. Experiments on the condensation of nitrogen and air in the solid phase on the surface cooled by liquid neon under conditions of transition and viseous regimes of the flow of pumped-out gas, are performed. It is shown that a considerable effect during pumping-out under these conditions is played by the thickness of the condensate layer and the presence of non-condensed admixtures in the pumped-out gas. In this case the specific quickness of pumping-out is much less than maximum theoretical.

31391 (IS-M—466) Magnetic impurity scattering in in situ superconductors. Finnemore, D.K.; Yang, H.C.; Kogan, V.G.; Miller, S.L. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 8p. (CONF-830841—35). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012835.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

Measurements of ac losses for in situ prepared superconducting composites consistently show loss values higher than those observed for bronze process materials. To get the measured ac loss one needs an effective filament size in the range of 20 to 50 μm. Our goal in this work is to understand quantitatively the origin of this coupling between filaments and to develop methods for contolling it. To reduce the ac losses it is desirable to reduce the cross linking of filaments and the proximity coupling through the Cu. This should not reduce J/sub c/ because in all cases J/sub c/ is controlled by pinning of the flux line lattice by either grian boundaries or superconductor-Cu boundaries. In fact, J/sub c/ vs H curves are essentially the same as for continuous filament materials. There is no evidence that a breakdown of the proximity coupling in the Cu controls J/sub c/ and there seems to be more than adequate filament-filament coupling. Therefore the goal is to reduce this filament-filament coupling, both cross joining and proximity coupling. The first step in this is to control proximity coupling by the introduction of magnetic impurities into the normal metal barrier. Presented here are the results of a study of the model system Pb-(AgMn)-Pb to understand all of the basic physics involved and to learn quantitatively the effects of magnetic impurity scattering in the N layer. Because both magnetic and non-magnetic scattering will be important in the Cu-Nb_3Sn systems we add both Mn and Al to the Ag to determine the effects of both the magnetic scattering rate (pi/sub $s/^{-1}$) and non-magnetic scattering rate (pi/sub $N/^{-1}$).

31392 (IS-M—468) Zero-quantum superconducting magnetic shield. Clem, J.R. (Ames Lab., IA (USA)). 1983. Contract W-7405-ENG-82. 18p. (CONF-8310227—8). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012871.

From Monopole '83 conference; Ann Arbor, MI, USA (6 Oct 1983).

The design of a new superconducting magnetic shield suitable for use with magnetic monopole detectors is described, together with a method for achieving a final state in which no magnetic flux quanta are trapped in the shield's central region. The magnetic shield consists basically of a specially designed superconducting cylindrical tube, equipped with electrical and magnetic devices to remove flux quanta trapped during cooldown. An electrical current is applied along the length of the tube to cause mutual annihilation of trapped vortices and antivortices in the tube's central region and thus to remove flux quanta transverse to the cylinder axis. A parallel applied magnetic field then moves an appropriate number of vortices and antivortices from tube-end reservoirs to opposite ends until no logitudinal flux quanta thread the tube. A procedure also is described by which the shield itself could be used as a monopole detector.

31393 (LA-UR—84-890) Los Alamos proposal for a National Underground Science Facility. Rosen, S.P.; Simmons, L.M. Jr.; Sharp, R.R. Jr.; Nieto, M.M. (Los Alamos National Lab., NM (USA)). 4 Jan 1984. Contract W-7405-ENG-36. 8p. (CONF-840148—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84010067.

From 3. international conference on baryon non-conservation; Park City, UT, USA (4 Jan 1984).

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We review the Los Alamos proposal for a National Underground Science Facility. We also stress the need for such a facility in the USA and the importance of the concept, regardless of location, as a unifying element for the community of scientists who want to carry out experiments underground.

31394 (LA-UR—84-1492) Effect of finite rotation on a problem in plastic deformation. Dienes, J.K. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 13p. (CONF-840746—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012627.

From International symposium on current theories of plasticity and applications; Norman, OK, USA (30 Jul 1984).

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The development of constitutive laws for large-strain plastic flow requires both an appropriate kinematic framework to characterize the deformation and a suitable set of physical relations between the selected measures of stress and strain rate. In this paper it is argued that deformation is best characterized by taking, as the measure of strain rate, the stretching (the symmetric part of the velocity gradient) and assuming that it can be represented as the sum of an elastic and plastic part. Though this is a natural extension (or perhaps only a restatement) of the 1930 hypothesis of Reuss, its consequences differ from some more recent hypotheses based on modern theories of deformation. Since plastic flow laws are expressed in rate form it is necessary to have a suitable definition of stress rate. Though this has has been a subject of much analysis and numerous hypotheses, Dienes has shown that a unique stress rate follows from the necessity of formulating the constitutive law in material axes, and that such a stress rate is frame invariant. The same paper shows the relation of rate of angular velocity (material rotation rate), deformation and spin (vorticity). In this paper this formulation is used in expressing constitutive relations for plastic flow, including both ideal plasticity and kinematic hardening, and the results are compared with those obtained using the Zaremba-Jaumann-Noll approximation. 24 references.

31395 (NP—4770289) Dimensioning of conveyor roads. (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 11p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770289.

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The development of belt conveyor systems in the Ruhr mining, their dimensioning, erection, operation and monitoring are discussed. The length of the system, the hoisting height and the conveying stream are to be indicated for the dimensioning of conveyor roads. The drafting forces of the conveyor belt are indicated for several kinds of drives.

31396 (NP—4770299) Status and development of the maximum cutting drivage. (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 9p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770299.

Fachgebiet: Vortriebstechnik; Teilgebiet: Vollschnittauffahrung.

The development of the maximum cutting machine since 1970 is discussed with respect to the topics boring heads, fixation of the bit, boring tools, timbering assistance, aftershock, aeration and dust suction. The control of geological fault regions and the securing of the drill space in order to be entered are the presently unsolved main problems.

31397 (NP—4770302) Experiences with part-face machines. (Westfaelische Berggewerkschaftskasse, Bochum (Germany, F.R.). Inst. fuer Betriebsfuehrung im Bergbau). 1982. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84770302.

Fachgebiet: Vortriebstechnik; Teilgebiet: Floezstreckenvortrieb.

Part-face machine headings perform a twofold driving velocity with respect to blasting headings and a little more advantageous costs per m of road. It is reported about operational experiences with machines of the light type (Alpina Mixer 50) and the heavy type (Alpina Mixer 100) of the company VOEST-Alpine. The main development points fo the fields "Improvement of the heading machines", "Improvement of the degree of utilization" and "Increase of the quality of the driven openings" are indicated.

31398 (PNL-SA—4868-Rev.5) Anomalies of nuclear criticality. Clayton, E.D. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1979. Contract AC06-76RL01830. 158p. (CONF-791103—114-Rev.5). NTIS, PC A08/MF A01; GPO Dep. Order Number DE84011547.

From American Nuclear Society meeting; San Francisco, CA, USA (12 Nov 1979).

During the development of nuclear energy, a number of apparent anomalies have become evident in nuclear criticality. Some of these have appeared in the open literature and some have not. Yet, a naive extrapolation or application of existing data, without knowledge of the anomalies, could lead to potentially serious consequences. This report discusses several of these anomalies.

31399 **(SAND—84-1127C) Robotic safety.** Kessel, D.S. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 9p. (CONF-8405182—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012237.

From ASME robotics symposium; Albuquerque, NM, USA (22 May 1984).

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Safety guidelines applicable to industrial robots are presented, including both intrinsic and external safety systems and equipment. Principle hazards associated with industrial robots include: being struck by moving parts of the robot, being trapped between the robot arm and other objects, and being struck by projectiles ejected by the robot. General safety guidelines for industrial robots and personnel safeguards are suggested. (LEW)

31400 **(SRD-R—266) SARTEMP2 - A computer program to calculate power and temperatures in a transport flask during a criticality accident.** Shaw, P.M. (UKAEA Safety and Reliability Directorate, Culcheth). Apr 1983. 31p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701719.

The computer code SARTEMP2, an extended version of the original SARTEMP program, which calculates the power and temperatures in a transport flask during a hypothetical criticality accident is described. The accident arises, it is assumed, during the refilling of the flask with water, bringing the system to delayed critical. As the water level continues to rise, reactivity is added causing the power to rise, and thus temperatures in the fuel, clad and water to increase. The point kinetics equations are coupled to the one-dimensional heat conduction equation. The model used, the method of solution of the equations and the input data required are given.

31401 (UCRL—50025-84-1, pp 1-6) **Motion-control system for the large optics diamond turning machine.** McCue, H.K. Apr 1984. NTIS, PC A03/MF A01. Order Number TI84011526.

In Electronics Engineering Department EE technical review.

Under the direction of the Air Force Wright Aeronautical Laboratory, the Lawrence Livermore National Laboratory built a precision vertical lathe to diamond turn large optical parts for the Defense Advanced Research Projects Agency. Designated the Large Optics Diamond Turning Machine (LODTM), this tool can machine a complex optical surface to within a figure error of one microinch (μin.) root mean square. This report outlines the LODTM design.

31402 (UCRL—50025-84-1, pp 15-18) **Ring-seating system.** Castleton, R.N.; Breitenbucher, P. Apr 1984. NTIS, PC A03/MF A01. Order Number TI84011526.

In Electronics Engineering Department EE technical review.

The Weapons Systems Group of the Nuclear Energy Systems Division (NESD) has been using a low-frequency induced-current heating (INCH) method, a dilatometer, and a software state machine to solve the practical problem of how to assemble the W87 warhead to the Mark 21 reentry vehicle (RV) shell.

31403 **(UCRL—90588) Cross-connection control and backflow prevention.** Mosovsky, J.A. (Lawrence Livermore National Lab., CA (USA)). 26 Apr 1984. Contract W-7405-ENG-48. 20p. (CONF-8405156—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011561.

From American Industrial Hygiene Association conference; Detroit, MI, USA (20 May 1984).

We discuss the elimination of potable-water contamination through backflow prevention, and present the elements of a comprehensive cross-connection control program currently in use at Lawrence Livermore National Laboratory (LLNL). This discussion includes the structure, objectives, practices, and policies which drive the LLNL program, along with typical examples of cross-connections. In our program, we emphasize that two types of cross-connections, inlet and pressure, should be eliminated to prevent backflow of contaminated water into potable systems. We also present material gathered from available literature on the theory of backsiphonage and backpressure that will provide concepts to form an effective cross-connection control program.

31404 **Multiwire conductor having greatly increased interwire resistance and method for making same.** Luhman, T.; Suenaga, M. (to Dept. of Energy). US Patent 4,426,550. 17 Jan 1984. Filed date 15 Mar 1982. vp.

PAT-APPL-358085.

An improved multiwire conductor of the type which is mechanically stabilized by a tin based solder filler. A solder filled conductor is heated to a temperature above its melting point for a period long enough to allow a substantial amount of copper to be dissolved from the wires comprising the conductor. The copper forms the brittle intermetallic compound Cu_6Sn_6 with tin in the solder. After cooling the conductor is flexed causing a random cracking of the solder, and thereby increasing the interwire resistance of the conductor. The subject invention is particularly adapted for use with braided, ribbon-type solder filled superconductors.

4203 Lasers

REFER ALSO TO CITATION(S) 31520, 32380, 32381

31405 **(DOE/ER/10978—7) Picosecond CO_2 laser pulses and applications.** Hoi-Sing Kwok. (State Univ. of New York, Buffalo (USA). Dept. of Electrical and Computer Engineering). 1984. Contract AC02-81ER10978. 4p. (CONF-840725—1). NTIS, PC A02 MF A01; 1; GPO Dep. Order Number DE84007350.

From 3. international conference on infrared physics; Zurich, Switzerland (23 Jul 1984).

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In this paper, we shall report some of the recent progress in picosecond CO_2 laser generation and their applications in studying the infrared physics of molecules and semiconductors. There are several methods of generation of picosecond CO_2 laser pulses such as mode-locking of high pressure CO_2 laser oscillators, semiconductor switching of a nanosecond TEA CO_2[3] laser, and Optical Free Induction Decay (OFID). The last method has been employed in our laboratory to produce 1 to 5 MW CO_2 pulses with a duration changeable from 30 ps to 300 ps. It is a convenient laser source for the study of molecules and semiconductors.

31406 **(EPRI-EM—3465) Assessment of materials-processing lasers. Final report.** Seaman, F.D. (IIT Research Inst., Chicago, IL (USA)). May 1984. 273p. Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303. Order Number TI84920315.

The number of industrial materials processing lasers in operation in the United States was estimated, and data regarding their application were tabulated. Emphasis was placed on assessing factors that would influence future increases in laser use as a manufacturing tool and the subsequent impact these increases would have on the size and character of utility loads. Analysis of the data shows that laser use in manufacturing industries can be expected to increase in the US due to the lasers' potential for improving manufacturing productivity. Heat treating and heavy-section welding appear to be applications of greatest potential growth. The high capital cost of lasers presents a barrier to general use, however. Lasers were tested for their load characteristics - especially power factor, harmonics, and electromagnetic interference. It was found that the power supplies used for industrial lasers would not pose any unusual problems for electric utility systems. Finally, the laser-related load in the US was determined and projected by geographical regions to the year 2000.

31529 **(CNAEM-R—200) Investigation of the response of improved self-powered neutron detectors.** Erk, S. (Cekmece Nuclear Research and Training Center, Istanbul (Turkey)). 1982. 65p. (In Turkish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701740.

The self-powered neutron detectors have been successfully employed for the most important parameters both for neutron flux and flux fluence determination. Their preference for such measurements due to their simplicity, convenience in use, rigidity, voluminal smallness and low price. However, self-powered neutron detectors depend on the type used, can only follow the neutron flux changes with a certain delay when they are compared to fission chambers which are thought to be the best detectors. In this thesis, a system has been proposed and considered carefully in order to speed up the response time, in another word, to correct the detector response to a level very near to fission chamber performance, a circuitry has been realized in the frame of principles so forth and applied to the experiments carried out in the TR-1 Reactor. Their positive results are presented.

31530 (DOE/ER/60142—1, pp 23-26) **Optimized alpha source collimator.** Rossi, H.H.; Kliauga, P. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Collimated alpha sources have been used at this laboratory for many years for the calibration of proportional counters. However, no attempt has been made in the past to optimize their design. Optimization here means designing the collimator to produce the largest transmission (count rate) for a given beam width. 1 figure, 1 table.

31531 (DOE/ER/60142—1, pp 52-82) **Microdosimetry and thermoluminescence.** Li, K.; Kliauga, P.; Rossi, H.H. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Some thermoluminescence (TL) experiments have been performed to further examine relevant properties of TL, and to establish quantitative relations for TL in terms of microdosimetry. Dose-response curves of LiF (TLD-100) to ^{137}Cs gamma rays and x rays were measured. It appears that a certain connection can be made between microdosimetry and TLD on the basis of the Theory of Dual Radiation Action. This may be of significance for both mirodosimetry and TLD. 21 references, 8 figures, 6 tables.

31532 **(EFI—539(26)-82) Contribution of cosmic muons to the spectrum of hadrons detected by the "Pion" installation.** Avundzhyan, A.T.; Asatiani, T.L.; Kazaryan, S.P.; Oganisyan, A.G.; Ter-Antonyan, S.V. (Erevanskij Fizicheskij Inst. (USSR)). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701739.

The technique of calculation of the expected spectrum of μ-meson bursts in the "Pion" installation detecting cosmic hadrons is described. The calculation results show that in the energy range E < or approximately 1000 GeV the expected spectrum of muon bursts depends on the conditions of the trigger pulse formation. Dependences obtained are presented. On the basis of these calculations the contribution of muons in the observed flux of single charged particles is estimated. In the energy range E >= 500 GeV the value <= 1.65% is obtained for the share of muons.

31533 **(EGG-M—27182) Implications of depth dose equivalent concept in personnel dosimetry.** Gupta, V.P. (Idaho National Engineering Lab., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 5p. (CONF-840512—8). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012644.

From 6. congress of the International Radiation Protection Association; Berlin, F.R. Germany (7 May 1984).

Current regulations in the United States require measurement of dose equivalent for protection at tissue depths of 1.0 g/cm^2 and 7 mg/cm^2 as prescribed in ANSI N13.11-1982 standard. This paper discusses a few implications of the depth dose equivalent requirements on the design of the personnel dosimeters. 4 references, 2 figures.

31534 **(FEI—1416) Buffer memory unit for time measurements at critical assemblies.** Balandin, A.F.; Regushevskij, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1983. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701894.

Structural flowsheet of buffer memory unit operating in the channel of direct access to "Ehlektronika 100/I" computer and program of accumulation and decoding of the data recorded in the assembler language are described. The unit is designed for the recording of time behaviour of neutron fluxes on critical assemblies with characteristic times of 1-100 μs.

31535 **(IAE—3676/2) Benchscale experiments at the "Neutrino detector" installation. ND-1.** Afonin, A.I.; Bogatov, S.A.; Borovoj, A.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1982. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701879.

Results of laboratory tests of the ND-1 neutrino detector, designated for investigation into energy distribution of antineutrino according to positron spectrum in νsub(e)+p $\rightarrow$ n+e$^+$ reaction are given. It is proposed, that described detector would operate in neutrino laboratory, constructed at Rovno NPP. Methods of detector calibration were developed. Calculation technique for determination of neutrino defection efficiency was supported by experiments. Liquid organic scintillator, containing gadolinium salts, serves as a target and detector simultaneously in considered installation. It detects back beta-decay according to summary scintillation, caused by positron and annihilation gamma quanta (the first event) and following it scintillation burst of gamma rays, occurring during neutron capture by gadolinium nucleus (the second event). It was concluded on the base of correlation of presented calculation and experimetnal data, that ND-1 installation is ready for operation and NEVGAM program, used for calculations is also suitable for calculation of neutrino detection efficiency.

31536 **(IAE—3784/14) Device for measuring optical characteristics of substances in the soft X radiation range.** Glebov, V.I.; Denisov, Eh.I.; Meshcherov, B.R.; Khlebnikov, A.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1983. 9p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701880.

The device assembled on the "Plasma" spectrometer base and which represents a monochromator connected with the chamber in which investigated samples are placed is described. The monochromator serves for separating a narrow spectral radiation range of a source mounted inside the device (X ray tube). The detecting system enables one to measure relative intensities of the incident and reflected (passed, diffracted) photon beams. The vacuum pumping out system ensures a required rarefaction in the device when radiation absorption becomes neglegible.

31537 (IAEA-TECDOC—280, pp 45-56) **Design of automated nuclear data systems for industrial application.** Heath, R.L. (Idaho National Engineering Lab., Idaho Falls (USA)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

There is a recognized need for on-line monitoring instrumentation that can provide continuous information concerning the distribution of radio-isotopes in nuclear power stations. Consideration of the approach to the design of automated nuclear spectrometry systems for this application provides an example of the operation of complex nuclear data systems in an industrial environment with a requirement for high reliability. Examples of installed systems used for isotopic assay of plant streams and effluents are discussed in some detail. Important considerations in the design of these systems include: (1) automated system energy calibration, (2) verification of system performance, (3) extreme dynamic range, and (4) automated data interpretation to provide plant personnel with information in a form to make operational decisions. High counting rate, front-end

electronics developed for this application are described. These systems utilize distributed architecture for optimized through-put and reliability. Trends illustrated in the design of these systems are considered to be applicable for all sophisticated measurement systems which incorporate computer techniques for data acquisition and analysis. The development of diagnostic techniques to insure proper operation of these systems is considered to be essential for field application of measurement systems of increasing complexity. It is anticipated that commercial equipment will be incorporating these techniques in the future.

31538 (IAEA-TECDOC—280, pp 133-172) **Interfaces and buses.** Attwenger, W. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

The concepts of "modularity" for nuclear electronic equipment certainly influenced the design of modern electronic instrumentation in almost all fields. The requirements for equipment associated with nuclear sciences were always in the fore-front concerning resolution, accuracy, counting rates, reaction times, data transfer rates, massive amounts of data, etc. The first internationally accepted standard in nuclear electronics based on the application of transistors and integrated circuits was developed by the NIM Committee which was set up by the National Bureau of Standards, Washington in 1963 (NIM-Nuclear Instrumentation Modules). The NIM-standard - still in use - assured mechanical, power supply, signal level, connector and cable compatibility. The digital data transfer capability between modules was not defined. Several manufacturers of NIM instruments and several laboratories are using the IEEE 488 bus (GPIB, General Purpose Interface Bus, IEC 625) as a digital bus now. The question as to whether supplementary specifications are feasible or desirable to ensure full compatibility is still under discussion. The NIM standard was developed for and was and is primarily concerned with analog instrumentation. As digital began to supplant analog instrumentation in the nuclear environment a new standard - CAMAC - was designed (started in 1964). CAMAC (Computer Automation in Measurement and Control) was developed by the ESONE Committee of European Laboratories in close cooperation with the NIM Committee. The system specifications were first published in March 1969. The paper gives an introduction to interfacing problems to the CAMAC standard (based on a publication by H. Klessmann) and to the GPI Bus. A brief survey on buses and on single board computers should demonstrate the subject, and should briefly indicate the future trends in the development of simple and complex systems.

31539 (IAEA-TECDOC—280, pp 183-195) **Preventive maintenance, service and repair of data acquisition and analysis systems.** Camin, D.V. (Comision Nacional de Energia Atomica, Buenos Aires (Argentina)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

Maintenance of Data Acquisition Systems is not a simple task, as is also the case with any other complex digital system. Preventive maintenance requires that precautions have to be taken from the selection of the system. Only properly trained and equipped service organisations should undertake the repairing. Manufacturers can take measures to make their systems more serviceable by adopting modern techniques to facilitate troubleshooting. Considerations both for the users and manufacturers are given in this report. A description of modern troubleshooting techniques is also given. Following the presentation of this report, some other considerations have been further elaborated.

31540 (IAEA-TECDOC—280, pp 301-317) **Nuclear instrumentation in a Hungarian Research Institute for Physics.** Csakany, A. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

The electronics staff of the Central Research Institute of Physics has developed a number of nuclear instruments, and manufactured them in small series. The paper describes some typical products used in research reactor control, dosimetry, radiation protection and in nuclear analytical series. The list of CAMAC modules manufactured at the Institute is added.

31541 (IAEA-TECDOC—280, pp 57-62) **Commercially available instrumentation versus custom-made equipment: A guide.** Machen, D.R. (Scientific Systems International, Kinetic Systems Co., Los Alamos, NM (USA)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

A dilemma facing all institutions, universities, and national or international laboratories - with very little exception - is the question of whether design, and perhaps fabrication, of instrumentation should be accomplished "in-house," or if the instrumentation should be procured commercially. This dilemma is particularly pressing today because the budgets for staff and equipment are being limited on a worldwide basis in the physical sciences. The design and fabrication capabilities of the research institute and the scientific instrumentation industry can be a compatible and mutually supportive team, provided both groups know and understand the other's problems and limitations. To this end a set of guidelines has been developed for several situations common in the physical sciences.

31542 (IFVE-ONF—83-112) **Drift chamber characteristics for inclined track detection.** Bozhko, N.I.; Borisov, A.A.; Vovenko, A.S.; Goryachev, V.N.; Kozhin, A.S.; Tumakov, V.L.; Fakhrutdinov, R.M.; Filippov, G.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1983. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701881.

A study was made on characteristics of drift chamber of 4x0.5 m size during detection of tracks of cosmic particles passing at 0 <= theta <= 70 deg angle with respect to normal to chamber plane. The chamber contains 4 signal wires of 3.7 m operating length, drift gap equals 250 mm and is filled with 94% Ar + 6% CO_2 mixture. Measurements were accomplished on special stand, including 6 drift chambers and 24 scintillation counters. Counters were integrated into 3 planes, which were switched on for coincidence and were designated to obtain trigger signal on cosmic particle passing through the instrument. Measurements were accomplished for -12.00+-0.05 kV drift potential (corresponds to 480 V/sm) and 2.17+- ..01 kV signal wire potential. Electronics system u provided amplification of signals of drift chamber wires, recording of responsed wire number, conversion of time information into numerical code and data delivery to the computer. Systematic displacement of track coordinate, coordinate resolution of a se signal wire, coordinate and angular ceparathamber resolution, efficiency of track reconstruction and resolution of left-right ambiguity, the member of wire signals were determined.

31543 (IFVE-ONF—83-113) **Time resolution of liquid argon detectors. Part 1. Optimal filter.** Krasnokutskij, R.N.; Fedyakin, N.N.; Shuvalov, R.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1983. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701882.

A study was made on the dependence of time resolution of liquid argon ionization chamber on electronic circuit parameters, energy losses in chamber gap, detector capacity and Ar purity. The techniqUe for evaluating optimal filtration of signals is presented. It is shown that the accuracy of time measUrement of 10 ns order can be achieved for minimum ionizing particle in detectors of low capacity (about 100 pf). It Was concluded that time resolution of liquid argon ionization chamber is directly proportional to detector capacity and is inversely proportional to ionization. It can be improved sufficiently by Ar purification and small methane additions.

31544 (INIS-mf—7782, pp 90-99) **Electronic circuits for activity measuring installations.** Chikosh, M.; Vagveldi, J. 1979. (In Russian). NTIS (US Sales Only), PC A13/MF A01. Order Number TI83780837. (CONF-7905228—).

From International symposium on methods of production and measurement of standard sources and solutions; Marianske Lazne, Czechoslovakia (15 May 1979).

Description is given in the paper of a scaler with time base, two-channel integral discriminator with automatic control and having preamplifier which is intended for 4π proportional counter under pressure. The circuit has an outlet for typing facility. Application of eight channels permits to measure activity of the most of radionuclides by the method of coincidence which gives the highest accuracy. Design of the circuit is given as well as results of it's operation and performance of two-channel integral discrimination with automatic control.

31545 (INIS-mf—7782, pp 121-137) **Method of constant metrological label and summary correction factor for measurement of radioactive concentration of pure β-emitters.** Chylinski, A. 1979. (In Russian). NTIS (US Sales Only), PC A13/MF A01. Order Number TI83780837. (CONF-7905228—).

From International symposium on methods of production and measurement of standard sources and solutions; Marianske Lazne, Czechoslovakia (15 May 1979).

New approach has been given to the technique of metrological labels which has been based on application of single label for measuring activity of different pure β-sources. The method has been discussed of determination of correction factor for coincidence methods, including corrections which have connection with sensitivity of a β-detector relative to γ-quantums, internal capture and complicity of decay scheme. The principle of summary correction factor has been used in the technique of metrological methods of measurement for determination of dependence of the summary correction factor from correlation of activity of label and β-source in a summary radiation source. Installation has been described for conducting measurements by the given method. In the installation are used: in the β-channel, - liquid scintillator and in the γ-channel, - Na(Tl) crystal. Results have been given of measurement of following β-sources: Ni-63, C-14, S-35, Ca-45, Tl-204, Sr-90 + Y-90, P-32. Methodology has been proposed of determination of systematic errors, connected with the method of metrological labels which have been discussed.

31546 (INIS-mf—7782, pp 156-167) **Investigation of false pulses in scintillator counter with liquid scintillator.** Broda, R.; Radoszewski, T. 1979. (In Russian). NTIS (US Sales Only), PC A13/MF A01. Order Number TI83780837. (CONF-7905228—).

From International symposium on methods of production and measurement of standard sources and solutions; Marianske Lazne, Czechoslovakia (15 May 1979).

Results have been presented of the investigation of false pulses, which are the reason for errors in the scintillation measuring technick. Spectrometer have been used which permits to measure pulses from separate channels, their sum and coincidences in integral and differential regimes of performance. False pulses were detected during measurements in separate channels but have been not detected during measurements of coincidence. Measurements have been done of radiation sources of ^{3}H, ^{14}C, ^{32}P and ^{201}Tl. It has been established that amplitude of false pulses corresponds to the amplitude of the pulse from β-particles which have energy level in the order of 1 keV and it is growing as anode voltage increases. Method has been given of determination of the number of false pulses by means of comparison of the efficiency of measurements which had been obtained experimentally to theoretical ones for separate channel and for coincidence.

31547 (INIS-mf—7782, pp 263-268) **Investigation of properties of K ;$4\pi^{125}$I and NNQ601 chambers.** Latal, F.; Kits, Ya.; Dryyak, P.; Khots, M. 1979. (In Russian). NTIS (US Sales Only), PC A13/MF A01. Order Number TI83780837. (CONF-7905228—).

From International symposium on methods of production and measurement of standard sources and solutions; Marianske Lazne, Czechoslovakia (15 May 1979).

Experience has been stated in the paper gained during exploitation of ionization chambers KG$4\pi^{125}$I of Polish fabrication and of chambers NNQ of Czechoslovakian fabrication. Special attention has been paid to determination of energy sensitivity to the energy range near to 30 keV. In the NNQ instrument there is it's own digitel system for estimation. Dynamic electrometer TAKEDA-RIKEN 840M (Japan) is used in the KG$4\pi^{125}$ I chamber. Specifications are compared of both types of chambers and their fitness for measurement of some nuclides.

31548 (INIS-SU—198, pp 247) **Possibility of study on the double neutrinoless beta decay by means of semiconductor beta spectrameters.** Vylov, Ts.; Briansson, Sh.; Brudanin, V.B.; Valen, R.; Gromov, K.Ya.; Marinov, A.; Minkova, A.; Osipenko, B.P.; Pokrovskij, V.N.; Chumin, V.G. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

31549 (INIS-SU—211, pp 13-15) **Symmetric sector magnetic analyzer with non-uniformal field and angle of boundary slope arctg(1/$\sqrt{2}$).** Trubacheev, G.M. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1982. (In Russian). NTIS (US Sales Only), PC A04/MF A01. Order Number TI84780255.

In Technique of physical experiment.

Highly-dispersion with high apertureb ratio aerration-free variants of ion-optic schemes (IOS) for symmetric sector magnetic analyzer with inhomogeneous fields and boundary slopings are searched. Analytical-numerical technique of the search is used: physically acceptable values of the curvature of the pole tips profile and analyzer boundaries are determined as the solution of the system of three linear albegraic solutions reflecting conditions of excluding axial aberrations of the image with account for the effect of scattered fields. By way of numeric analysis the range of the optimum values of dispersion, apertuofre ratio, spherical aberration and the slope o the focus line in the whole range of variation of the sector angle and parameter of field inhomogeneity. It is shown that optimum IOS variants are realized in the whole range of sector angle variation and inhomogeneity parameter.

31550 (JINR—8-83-45) **Inertial characteristics of cryogenic temperature sensors-dosemeters.** Datskov, V.I.; Zajtsev, L.N.; Kleshchenko, E.D.; Muntyan, S.V.; Shishov, Yu.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701861.

Time constants of heating and cooling of resistive cryogenics temperature sensors "Allan-Bradley", TVO and of a temperature sensor manufactured of Cu-Ni are measured in 4.2-10 K temperature range. These are intended for use as dosemeters. For a less inertial temperature sensor TVO-0.125 the value of time constant of heating does not exceed 10 ms, and time constant of cooling - 8 ms at 10 K temperature.

31551 (JINR—10-83-538) **Scanning control in the AELT-2/160 measurement system on-line with CM-4 computer.** Baranchuk, M.K.; Lapchik, Eh.D.; Rubtsov, V.F.; Smirnov, V.N.; Khoromskaya, V.Kh.; Shkundenkov, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1983. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701897.

For substituting the BESM-4 control computer in the AELT-2/160 measurement system by the SM-4 computer the new control and interface hardware is developed. The functional group including four CAMAC blocks designed for scanning control are considered. These blocks under computer control enable scanning by a string line or a slice of arbitrary length. The string can be oriented in any direction and can begin in any point within the operating range of the scanning CRT.

31552 **(JINR—13-83-37) Results of analysis of circuits for pulse shapers charging in the power supply system of streamer spark chambers.** Aksinenko, V.D.; Kaminskij, N.I.; Matyushin, A.T.; Matyushin, V.T. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701738.

Results of analysis of different circuits for charging of pulse shapers are presented. These circuits and their main parameters (energy transfer coefficiency, relative amplitude of charging voltage, charging time) are tabulated. It is shown that among the circuits that provide for full transmission of initial stored energy on the load and maximum voltage transfer the two section and three section ones offer a number of advantages. In contrast to the known circuit of coreless pulse transformer, these circuits have less values of coupling coefficient and of primary maximum of charging voltage. The block diagram of charging circuits are as follows: Arkadiev-Marx generator - charge inductance - two section (three section) circuit-pulse shaper.

31553 **(JINR—13-83-436) Equivalent rectangular pulse of high voltage power supplies for a streamer chamber.** Aksinenko, V.D.; Glagoleva, N.S.; Dement'ev, E.A.; Matyushin, A.T.; Matyushin, V.T. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701884.

Formulae allowing to calculate the parameters of equivalent rectangular pulse (amplitude and duration) are derived. The calculation are performed basing on the streamer mechanism of a discharge. Comparison of parameters of equivalent rectangular pulse for unipolar pulses on the outputs of single and double forming lines is performed, and the condition has been found which limits the application of a double forming line at the reduction of forming pulse duration. Shape and parameters of prepulse appearing on electrodes of streamer chamber at a pulse charge the double forming line are given. The influence of prepulse and postpulse on parameters of equivalent rectangular pulse is shown. Comparison of parameters of equivalent rectangular pulses for real pulses on the electrodes of different streamer chambers, showing the advantages of inpolar pulse for thier supply, are presented.

31554 **(JINR—R-1-83-328) Energy model of increasing radiation and the size of an electron avalanche in a streamer chamber.** Glagoleva, N.S.; Matyushin, A.T.; Matyushin, V.T.; Nupgozhin, N.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701736.

A qualitative model is proposed of increasing light radiation and the size of an avalanche with increased gas amplification N in a streamer chamber based on the proportion of the light radiation of electrostatic avalanche energy. From the model it follows that the quantity αEN (α is the first Townsend coefficient and E is the pulsed electric field) is a constant at an invariable threshold of radiation detection. The results obtained within the framework of the model do not contradict athe available experimental data and show that the size of the avalanche in the streamer chamber can be no larger than several microns.

31555 **(JINR—R-13-82-901) System of three-meter drift chambers operating in self-quenching mode.** Alekseev, G.D.; Ganichev, V.I.; Karpukhin, V.V.; Kruglov, V.V.; Nemenov, L.L.; Khazins, D.M.; Chvyrov, A.S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701727.

The system of 12 drift chamber planes 3x0.8 m^2 in dimension, operating in self-quenching mode, is described. The system is a part of experimental setup for investigation of relativistic positronium on the IHEP proton synchrotron. Chamber construction and its technology do not require precision when making large size details and are suitable for designing chambers of large size with small quantity of matter for passing particles. The planes are assembled in three packages. Each package consists of two X- and two Y-planes and its overall thickness is 60 mg/cm^2. Electronic equipment of the chambers consists of read-out and control systems. Exploitation of the drift chamber systems in experiment has shown their high efficiency (99% at $2x10^6$ particle/s m^2 flux), high reliability and exploitation simplicity. Coordinate accuracy of the chambers equals to approximately 0.2 mm.

31556 **(JINR—R-13-82-902) Drift chamber electronics setup for relativistic positronia studies.** Karpukhin, V.V.; Kruglov, V.V.; Kuptsov, A.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701737.

The organization of electronic equipment for the system of 24 drift chambers in the experiment on the investigation of relativistic positronia on IHEP proton synchrotron is described. Drift chambers operate in self-quenching streamer (SQS) mode. Electronic equipment consists of read-out and control systems. Total number of the read-out channels is 2496. The use in these chambers of SQS mode simplifies the construction of the amplifier-shaper and ensures low noise chambers. The specialized electronic processor is used in the read-out system for improvement of the effect/background ratio. The control system finds automatically defective read-out channels and permits to determine time and threshold spreads of read-out channels. The control system can operate both in autonomous regime and on-line the computer. The brief description of the electronic units is given.

31557 **(JINR-R—1-2-13-83-81) IPHE-JINR neutrino detector.** (Joint Inst. for Nuclear Research, Dubna (USSR)). 1983. 158p. (In Russian). (CONF-820192—). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84780157.

From 3. working conference on IPHE-JINR neutrino detector; Dubna, USSR (18 Jan 1982).

The papers presented were entered into the data base separately. (WHK)

31558 **(MRP/MRL—82-3(TR)) Progress report on a technical evaluation of four personal alpha-dosimeters in two underground uranium mines in the Elliot Lake area.** Bigu, J. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Dec 1981. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701887.

Four personal α-dosimeter prototypes were evaluated at several locations underground at two Elliot Lake uranium mines for periods of up to four weeks in duration. The dosimeters evaluated were: Track-etch: 16 units; H β H: 6 units; TDL/CAMPED: 6 units; α-Nuclear: 6 units. The factors evaluated were pump flow rate constancy, pump durability, reproducibility of results, agreement with grab-sampling tests, filter loading, contamination and mechanical and electrical problems, as well as preference by the miner wearing the dosimeter. No one dosimeter type was superior in all the factors evaluated, and the miners showed no preferences for a specific dosimeter.

31559 **(MRP/MRL—82-24(TR)) Experimental procedures for the calibration of scintillation cells used in the determination of radon gas concentrations.** Grenier, M; Bigu, J. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Feb 1982. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701886.

Experimental and analytical procedures are described for the calibration of scintillation cells used for the determination of radon gas concentration. In-house designed and built scintillation cells, used routinely in the monitoring of radon gas in uranium mine underground environments and in the laboratory, were calibrated. The cells had a volume of approximately 158 cm^3 and an α-counting efficiency ranging from 50% to 64%. Calibration factors for the cells were determined. Values ranged approximately from 0.177 $cpm/pCiL^{-1}$ (4.77 cpm/BqL^{-1}) to 0.224 $cpm/pCiL^{-1}$ (6.05 cpm/BqL^{-1}). The calibration facilities at the Elliot Lake Laboratory are briefly described.

31560 **(MRP/MRL—82-36(TR)) Calibration of environmental monitors operating on time integrating principles for radon/thoron decay products.** Bigu, J.; Grenier, M. (Canada Centre for Mineral and Energy Technology, Ottawa, Ontario). Mar 1982. 42p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701888.

An environmental radiation monitor for radon decay products has been tested under laboratory controlled conditions. The instrument is of a quasi-time-integrating type and was tested in conjunction with a radon 'box' calibration facility. It has been found that the instrument appreciably underestimates the radon daughter Working Level (WL). This is attributed to plate-out of decay products in the monitor sampling head. The difference between monitor reading and the WL by grab-sampling was higher for low aerosol concentrations. Plate-out on the instrument detector and sampling head, and contamination effects have been observed for the thoron case. There is partial agreement between experimental results and theoretical expectation. The monitor is slow to react to sudden changes in radiation level. The instrument should prove quite useful in the routine monitoring of surface and underground environments provided some suggested changes in the instrument are introduced.

31561 **(RL—82-085) Reconstruction of data for an experiment using multi-gap spark chambers with six-camera optics.** Maybury, R.; Daley, H.M. (Rutherford Appleton Lab., Chilton (UK)). Jun 1983. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701889.

A program has been developed to reconstruct spark positions in a pair of multi-gap optical spark chambers viewed by six cameras, which were used by a Rutherford Laboratory experiment. The procedure for correlating camera views to calculate spark positions is described. Calibration of the apparatus, and the application of time- and intensity-dependent corrections are discussed.

31562 **(RL—83-094) Medium energy transfer spectrometer; a crystal monochromator design.** Tomkinson, J. (Rutherford Appleton Lab., Chilton (UK)). Sep 1983. 35p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701890.

The report is in sections, entitled: introduction; scientific specification; monochromators (single crystal geometry; double crystal geometry; choice of crystals (copper)); an initial mechanical design; the resolution of the MET crystal monochromator (collimation; resolution calculations; comparison with other spectrometers); specifications of the MET (crystal) spectrometer; suppression of high orders; intensity calculations (intensity comparisons between crystal and chopper versions of (MET); neutron momentum transfer resolution.

31563 **(TRI-PP—82-38) Engineering developments on the UBC-TRIUMF modified PETT VI positron emission tomograph.** Evans, B.; Harrop, R.; Heywood, D. (TRIUMF, Vancouver, British Columbia (Canada)). Oct 1982. 4p. (CONF-821011—55). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701891.

From IEEE nuclear science symposium; Washington, DC, USA (20 Oct 1982).

A tomograph with the PETT VI geometry has been built with improvements generally applicable to such devices. In addition to improved temperature control, the gantry features commercial CsF detectors with the newer Amperex photomultiplier tubes. Much of the coincidence support circuitry is of an original design, utilizing new 'fast' TTL family devices. A local DEC 11/23 microprocessor provides for routine diagnostic and reliability checking, gantry control, and acquisition of single detector counting rates. Image reconstruction and display is performed by a medium size VAX 11/780 computer, operating in a time-sharing environment. Some preliminary performance characteristics of the machine have been measured. The reconstructed resolution in-slice, as well as the reconstructed slice thickness, has been measured as a function of radius for both 'straight' and 'cross' slices.

31564 (ZfI-Mitt—71, pp 150-153) **Radiometric determination of ash content of raw lignites.** Fritzsche, D.; Dolak, W. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

31565 (ZfI-Mitt—71, pp 155-161) **Simplified mathematical model for scattered transmission of X-rays in raw brown coal.** Braune, M. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A simplified mathematical model is presented which renders it possible to calculate the ash content of lignite from scattered transmission of X radiation taking into account two grain classes, the bulk density, and the fill height. The fine grain is assigned to sand and the coarse one to lignite. The model provides a correlation between the fine grain content and the counting rate.

31566 (ZfI-Mitt—71, pp 74-78) **Nuclear radiation detectors using high resistivity neutron transmutation doped silicon.** Gessner, T.; Irmer, K. (Technische Univ., Dresden (German Democratic Republic). Sektion Physik). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A method for the production of semiconductor detectors based on high resistivity n-type silicon is described. The n-type silicon is produced by neutron irradiation of p-type silicon. The detectors are produced by planar technique. They are suitable for the spectrometry of alpha particles and for the pulse count measurement of beta particles at room temperature.

31567 (ZfI-Mitt—71, pp 259-264) **Implementation of Intel 8080 - based microcomputer system in the radioisotope measurements control instrumentation.** Gasiorowski, L.; Mrozinski, P.; Sobkowicz, K.; Zrudelny, F. (Institute of Nuclear Research, Warsaw (Poland)). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The Intel 8080 - based microcomputer system developed for application in radioisotope gauges as well as for medical equipment is presented. The system is used as standard hardware to set up measuring instruments manufactured in small series. Brief description of the system and separate modules parameters are given. As an example of application, the configuration for multichannel analysis is described.

31568 (ZfI-Mitt—71, pp 252-258) **Neutron multiplicity detector for the study of rare nuclear decay events.** Ter-Akopian, G.M.; Sokol, E.A.; Fam Ngok Chyong; Ivanov, M.P.; Chelnokov, L.P.; Smirnov, V.I.; Gorshkov, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

A ^{3}He-counter neutron detector designed to register rare spontaneous fission events by detecting multiple neutron events is described. The single detection efficiency of the detector was 0.48 and 0.73 at detector sensitive volumes of 10 and 0.3 l, respectively. With concrete shielding and a scintillation anticoincidence system the background was 1 event per day. The background from detector single neutron pulses was 80 h^{-1}. The possibilities of using this detector to search for superheavy nuclei, detect small quantities of spontaneously fissioning transuranium nuclides, for uranium, beryllium and other elements analyses are discussed.

31569 (ZfI-Mitt—71, pp 9-16) **Characterization of coulometric and hypercoulometric ECD mode of operation.** Popp, P.; Leonhardt, J. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The coulometric mode of operation is given, if each sample molecule passing the ECD is converted into a negative ion and if each negative ion causes a decrease of the ionization current. The sensitivity of the detector in this case amounts to 96500 C/mol. A hypercoulometric response is given, if fragments from dissociative processes undergo electron capture at several times and if the enhancing effect of space charges is used. In this case the sensitivity of the ECD exceeds the upper limit given by Faraday's number. The operation conditions of both ECD modes are described.

31570 (ZfI-Mitt—71, pp 18-24) **Calculation of current-voltage characteristics of electron-capture detectors.** Hinneburg, D.; Grosse, H.J.; Leonhardt, J.; Popp, P. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

Starting from the law of conservation of charge a stationary one-dimensional non-linear differential equation system is derived, which is applied to the direct-current mode of an electron-capture detector with parallel electrode plates. The theory takes into account space-charge, recombination, and inhomogeneous ionization and it deals with three kinds of charge carriers with different mobilities (positive and negative ions, electrons). Terms due to diffusion and gas-flow losses are excluded. The equations so constructed were programmed to get a means of calculating the charge and field distributions and the current-voltage characteristics as functions of various parameters of the detectors, the attaching gas and the ionization. For two cases the results are given.

31571 **Multidetector alpha spectroscopy analysis system.** Guilmette, R.A.; Archibeque, F.A. (Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM). *Health Physics;* **46**: No. 3, 639-646(Mar 1984). Contract AC04-76EV01013.

This document describes the attributes of an alpha spectroscopy counting and analysis system called Low Level Pulse Height Analysis (LLPHA). It was developed for multi-sample alpha spectroscopy analysis. The LLPHA system is controlled by a MIK-1 1/2 microcomputer with 28K of memory and uses a double-density, dual floppy disk for data storage. Detectors are interfaced to the computer via CAMAC (Computer Automated Measurement and Control) equipment. The system simultaneously supports 32 active and independent surface-barrier α-particle detectors. It operates with the total collection rate of up to 300 counts/sec from all active detectors, using 128 channels per spectrum and dynamic energy range of 1.4 MeV. In addition to spectral acquisition, the system provides analysis functions which include peak identification, curve-smoothing, integration, linear and logarithmic scale graphics, and corrections for base-line shift, dead-time, and background counts.

31572 **Gold-mask technique for fabricating segmented-electrode germanium detectors.** Luke, P.N. (Lawrence Berkeley Laboratory, University of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 312-315(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

A simple gold-mask technique has been developed for use in the fabrication of germanium nuclear radiation detectors. A layer of gold deposited over the contacts of the detectors acts as masks for chemical etching and surface treatments. It also serves as a reliable, low resistance electrical connection to the underlying germanium contact. This technique greatly facilitates the fabrication of a wide variety of segmented-electrode planar and coaxial detectors. Examples of these detectors with applications in medical imaging, gamma-ray astronomy and high-energy physics are presented.

31573 **Induced radioactivities in silicon and germanium irradiated with high-energy heavy ions.** Sakai, E. (Japan Atomic Energy Research Institute, Tokaimura, Nakagun, Ibarakiken 319-11). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 316-319(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Gamma-ray spectra from silicon and germanium irradiated with high-energy heavy ions of 50 MeV boron, 100 MeV oxygen, 150 MeV chlorine, 150 MeV nickel and 80 MeV iodine were measured after the irradiated samples had been taken out from the irradiation chamber. Residual radioactive nuclides, their radioactivities and the numbers of atoms are listed.

31574 **Hp Ge: Purification, crystal growth, and annealing properties.** Hall, R.N. (Corporate Research and Development, G.E. Company, Schenectady, NY 12301). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 320-325(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The prospects for growing HP Ge crystals of increased size and purity are examined. One interesting approach is to grow dislocation-free crystals, which must then be annealed to reduce the concentration of V_2H traps. The phenomena which occur during annealing are discussed and compared with experiment. Hydrogen, present in atomic form at the growth temperature, forms H_2 molecules during cooling, causing the effective diffusion coefficient to decrease rapidly. Models representing the reactions between H and the V_2H, A(H, Si), and D(H,O) complexes are presented and analyzed.

31575 **Deep level impurities in germanium and silicon: low temperature passivation or removal techniques.** Pearton, S.J.; Haller, E.E.; Kahn, J.M.; Tavendale, A.J. (Lawrence Berkeley University, University of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 326-330(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Deep level impurities and defects in high-purity germanium and silicon radiation detectors are often the cause of degraded spectral resolution. Exposure of the semiconductor diode to a low pressure hydrogen plasma may neutralize the electrical activity of a wide range of line and point defects and contaminating impurities, such as copper in Ge and gold in Si. The efficiency and thermal stability of this technique are discussed. The application of other novel methods of defect removal, such as the room temperature drifting of charged defects out of the depletion region under the action of the electric field in a diode, and the recombination enhanced annealing of radiation damage centers in Ge is also discussed.

31576 **Si(Li) x-ray detectors with amorphous Silicon passivation.** Walton, J.T.; Cork, C.P.; Pehl, R.H.; Wong, Y.K. (Lawrence Berkeley Laboratory, University of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 331-335(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Lithium drifted SiLi detectors with thin lithium n^+ contacts and amorphous silicon (α-Si) junction passivation are described. These detectors (7mm thick, 9cm² area) are intended for use in a six-element detector array which is designed to measure trace amounts of plutonium is soil samples. Results are given showing a spectral resolution of $\approx$400 ev (FWHM) for 17.8 kev N/SUB p/ L x-rays entering through either the lithium n contact or the gold barrier contact on these detectors. Measurements on the effects of the

fractional H_2 concentration on the electrical behavior of the a-Si/Si interface are reported. The increase with time in the lithium window thickness when the detectors are stored at room temperature is discussed.

31577 **FASTBUS Processor Interface for VAX-11.** Yasu, Y.; Arai, Y.; Hayano, R.; Karita, Y.; Kawaguchi, F.; Uema, K.; Watase, Y. (National Laboratory for High Energy Physics (KEK) Oho-machi, Tsukubu-gun, Ibaraki 305). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 197-200(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

FASTBUS Processor Interface (FPI), a high-speed interface which connects a FASTBUS cable segment to a VAX-family computer, has been developed at KEK in collaboration with DEC. The FPI overview, FPI implementation and benchmark results are discussed. In particular, it has been shown that FPI can transfer a 32-bit word every 200 nsec in the FASTBUS pipeline transfer mode. FPI conforms to the Nov. '82 FASTBUS specifications, and is supported by the FASTBUS Standard Routines.

31578 **Data acquisition and FASTBUS for the Mark II detector.** Lankford, A.J.; Glanzman, T. (Stanford Linear Accelerator Center, Stanford University, Stanford, CA 94305). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 225-229(Feb 1984). (CONF-831015—). Contract AC03-76SF00515.

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The architecture of the data acquisition system for the upgraded MARK II Detector is sketched. FASTBUS electronics planned for the system are discussed.

31579 **FASTBUS simplex segment interconnect.** Endo, I.; Yamashita, T. (Dept. of Physics, Hiroshima University, Hiroshima 730). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 236-238(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

A unidirectional FASTBUS Segment Interconnect has been designed. It passes operation from a cable segment to a crate segment. Basic tests of the first version are finished.

31580 **Performance of reverse electrode HPGE coaxial detectors after light damage by fast neutrons.** Raudorf, T.W.; Pehl, R.; Trammell, R.C.; Wagner, S. (EG & G Ortec, 100 Midland Road, Oak Ridge, TN 37830). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 253-257(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Several reverse electrode HPGe coaxial detectors fast neutron-damaged to various fluences were annealed at room temperature for varying periods of time. For comparison, in one case a dry ice temperature anneal was made. The result of these annealings on the energy resolution at 1.33 MeV was measured. The effect of source intensity and energy on the energy resolution and line shape are discussed.

31581 **Scintillation detection with large-area reach-through avalanche photodiodes.** Petrillo, G.A.; Lamouveux, G.; Lecomte, R.; McIntyre, K.J.; Schmitt. (RCA Inc., Electro-Optics, Ste-Anne-de-Bellevue, Quebec, H9X 3L3). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 417-423(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Silicon avalanche photodiodes of the "reachthrough" type have been used as scintillation detectors with device performance closely approaching that of PMT's. The device consists of a 6X6mm diode with a 5X5mm photosensitive area in a 6.7X6.7X2.0mm package which is suitable for mounting in an array. Typical characteristics at room temperature are: quantum efficiency =50% at λ=415nm; surface dark current <200nA; bulk dark-current (before gain) <1nA; noise current (at optimum gain of 20 to 50) <1pA/Hz/SUP 1/2/; response time <5ns; capacitance =21pF; biasing voltage =200-400 Volts. When coupled to a NaI(T1) scintillator (9X9X38mm) photo-peak resolutions (FWHM) for 662keV radiation of 10.4% at 21°C and 9.8% at 0°C were measured. The measured noise equivalent primary charge of one detector at a gain of 50 was 121 electrons (51 electrons rms) at room temperature. The significance of this new detector to high resolution imaging systems and detector arrays is discussed.

31582 **A diode intensifier tube designed for scintillation detection.** Paulin, J.; Boutot, J.P.; Jatteau, M.; Richard, J.C. (Laboratoires d'Electronique et de Physique appliquee 3, Avenue Descartes, 94450 Limei-Brevannes). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 433-437(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

An input and output faceplates diode intensifier tube having a large ratio (.8) "useful-external diameters" has been designed with a view to reach very good performance in scintillation detection. The photoelectrons emitted by the bialkali photocathode are accelerated up to about 10 kV and collected on a fast blue phosphor screen. The design is described and the main technological problems which have to be solved are reported, in particular the one allowing to overcome wall charge effects. The experimental results on image distortions, electron and photon gains, single electron resolution, dark noise, as well as on the phosphor screen characteristics are given. An assembly of this tube working as a high photon gain (=30 at 10 kV) light pre-amplifier, optically coupled to a fast photomultiplier could allow to obtain significant improvements of the FWHM energy resolution in scintillation detection by using a rather large NaI(T1) scintillator block (e.g. 9.4 % at 122 KeV instead of 10.5 % obtained with the fast PMT used alone).

31583 **Nanogate- a nanosecond gated image intensifier with high gain and high resolution.** Pfeiffer, W.; Wittmar, D. (Technische Hochschule Darmstadt, Schlossgraben I, D-6100 Darmstadt). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 429-432(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The investigation of luminous phenomena with two-dimensional resolution in space and resolution in time requires electro-optical devices which can be gated for very short time intervals. Image intensifiers are presently mainly used for this purpose. They are available either as image intensifiers with microchannel plates or as image intensifier diodes. Due to secondary electron multiplication, microchannel plate intensifiers have high gain; if image intensifier diodes are used, up to three diodes must be cascaded to attain a comparably high gain. This paper presents an image intensifier cascade consisting of three image intensifier diodes which are coupled by fiber optics. The first image intensifier is used as an electro-optical high-speed shutter. Since the entire supply voltage of 9 KeV has to be pulsed, a diode with an electrode spacing of only 1.5 mm is used; the gain for this voltage is about 50. The two cascaded image intensifiers have an electrode spacing of 2.5 mm and a supply voltage of 15 KeV each and are used for the light amplification of the output of the first intensifier. This amplification is about 3,500. The third intensifier has a quartz glass input window which provides useful sensitivity in a spectral range of about 180 to 900 nm. A transistorized high voltage pulse generator, developed according to the Marx cascade and coupled to the intensifier, is described. The advantages and disadvantages of such a cascade compared to a microchannel plate intensifier are discussed.

31584 **Using photoconductivity to improve image tube gating speeds.** Gobby, P.L.; Aeby, I.; Jaramillo, S.A.; Noel, B.W.; Yates, G.J. (Univ. of California, Los Alamos Nat'l. Lab., P.O. Box 1663, Los Alamos, NM 87545). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 509-511(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The gating speed of photoelectric image tubes is strongly dependent on the sheet resistance of the photocathode. The use of semiconductor and insulator photocathodes is attractive for many applications because of their spectral response and photoelectric yield. However, typical resistivities of such materials are many orders of magnitude greater than those of metals. As a result, image tubes utilizing such photocathode materials can have unacceptably slow gating speeds. The purpose of this paper is to suggest the alternative of using the inherent photoconductivity of these materials to decrease their resistivities. The image tube photocathodes would thus be subjected to light from two sources: one from the event being recorded and one from a second source--such as a pulsed laser--to increase the conductivity and allow a faster gating speed. Such a technique would not be expected to significantly alter the intrinsic spectral response or photoelectric yield from the material. A simple model applicable to the technique and a preliminary experiment are described.

31585 **Monte Carlo simulation of charge collection time in closed ended HP Ge gamma detectors.** Quaranta, A.A.; Catellani, A.; Pizziolo, G.; Zanarini, G. (University of Modena, Modena). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 900(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Charge collection dynamics for gamma radiation in closed ended HP Ge detectors is numerically computed by means of a Monte Carlo simulation. The resulting collection time spectra for different bias voltages are then compared with the ones obtained for true coaxial detectors. The geometrical shape of closed ended detectors affects charge collection times mainly for weakly energetic gamma rays and low bias voltages, adding both a slow and a fast tail to time spectra.

31586 **Gamma-ray detectors for intelligent, hand-held radiation monitors.** Fehlau, P.E. (Los Alamos Nat'l. Lab., Los Alamos, NM 87545). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 664-667(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Small radiation detectors based on HgI_2, bismuth germanate (BGO), plastic, or NaI(Tl) detector materials were evaluated for use in small, lightweight radiation monitors. The two denser materials, HgI_2 and BGO, had poor resolution at low-energy and thus performed less well than NaI(Tl) in detecting low-energy gamma rays from bare, enriched uranium. The plastic scintillator, a Compton recoil detector, also performed less well at low gammaray energy. Two small NaI(Tl) detectors were suitable for detecting bare uranium and shielded plutonium. One became part of a new lightweight hand-held monitor and the other found use as a pole-mounted detector for monitoring hard-to-reach locations.

31587 **Distortion and pulse shaping of short electrical pulses from dispersion of microstrip lines.** Hasnain, G.; Arjavalingam, G.; Dienes, A.; Whinnery, J.R. (Dept. of Electrical Engineering and Computer Sciences, and the Electronics Research Lab., Univ. of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 512-515(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Photoconductive switches, using short optical pulses to generate or switch electrical pulses as short as a few picoseconds, are conveniently made by using gaps in microstrip transmission lines on semiconductors. The spectral width of the generated pulses is a few hundred gigahertz and the dominant, quasi-TEM mode of the microstrip is known to be dispersive over this frequency range. The pulses consequently change shape as they propagate along the strip. Calculations are made of this dispersion for a variety of dimensions and dielectrics. Gaussian pulses with picosecond widths may become seriously distorted in a few millimeters for a typical configuration. For a certain distance asymmetric pulses may become sharpened, so there is some possibility of useful pulse shaping by means of this dispersion. In addition to the dispersion arising from the geometric effects, there may be additional dispersion from conductor losses, radiation, or the dispersion in the dielectric. These last-mentioned effects are generally of second order importance for typical lines used, but calculations are made to show some of their effects upon the dispersion and pulse shaping.

31588 **Nanosecond image shuttering studies at Los Alamos National Laboratory.** Yates, G.J.; Aeby, I.; Detch, J.L.; Gobby, P.L.; Jaramilla, S.A.; King, N.S.P.; Noel, B.W. (Physics Division, Univ. of California, Los Alamos Nat'l. Laboratory, Group P-15, Mail Stop D406, P.O. Box 1663, Los Alamos, NM 87545). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 484-489(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Experimental results comparing gated imaging capabilities of proximity-focused microchannel-plate intensifiers and electrostatically-focused siliconintensified-target vidicons are presented. A brief summary of previous response data obtained from several standard and modified versions of both image sensors and current efforts on sector gating of segmented photocathodes, pre-pulsing of photocathodes with infrared light to increase conductivity, and gate pulse injection techniques are discussed. Segmented photocathodes increased gating speed by simultaneous turn-on of individual sectors whereas preliminary analyses indicate no improvements from infrared illumination.

31589 **Cryogenically cooled broad-band GaAs field-effect transistor preamplifier.** Lo, C.C.; Leskovar, B. (Lawrence Berkeley Lab., Univ. of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 474-479(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

A cryogenically cooled 1-2 GHz low-noise broad-band prototype preamplifier utilizing GaAs field-effect transistors is described. The preamplifier has an average gain of 30 dB at ambient temperatures of 293°K and 18°K, respectively. The noise figure has a minimum value of 0.75dB at 300°K and 0.24dB at 18°K. The optimum preamplifier operating conditions for a minimum noise figure at temperatures of 293°K, 80°K and 18°K are given and are discussed. Also, the phaseshift characteristics, the input and output voltage standing-wave ratio as a function of frequency and intermodulation products content as a function of the input power level were measured.

31590 **Construction of a broadband universal sampling head.** Andrew, J.R.; DeWitte, G.J. (Picosecond Pulse Labs, Inc., P.O. Box 44, Boulder, CO 80306). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 461-464(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

A broadband, feed-through, sampling head with a transition duration of 26 ps has been built using a wide-band, thin-film mixer from an Hewlett-Packard (H-P) frequency counter. This head can be used with both Hewlett-Packard (H-P) and Tektronix sampling oscilloscopes. Responses of this head, and other sampling heads, to a standard input step waveform are shown.

31591 Segmentation and pulse shape discrimination techniques for rejecting background in germanium detectors. Roth, J.; Lin, R.P.; Primbsch, J.H. (Space Sciences Lab., Univ. of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 367-371(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

The authors examine the possibility of rejecting the internal β-decay background in coaxial germanium detectors by distinguishing between the multi-site energy losses characteristic of photons and the single-site energy losses of electrons in the range 0.2 - 2 MeV. The photon transport was modeled with a Monte Carlo routine. The authors also investigate background rejection by both multiple segmentation and pulse shape discrimination techniques. The efficiency of a six 1 cm-thick segment coaxial detector operating in coincidence mode alone is compared to that of a two-segment (1 cm and 5 cm) detector employing both front-rear coincidence and PSD in the rear segment to isolate photon events. Both techniques can provide $\geqq$ 95% rejection of single-site events while accepting $\geqq$ 80% of the multi-site events above about 500 keV.

31592 Current status of the microchannel plate. Matsuura, S.; Oba, K.; Okuyama, C.; Umebayashi, S. (Hamamatsu Photonics K.K., Ichino-cho, Hamamatsu). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 399-403(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

More than one order of improvement of the saturation effect was achieved by developing low resistance channel wall material and improved H_2-reduction processing condition and introducing non-uniform resistance distribution along the channel. The nonuniform resistance distribution was also found to improve life problem because it can compensate the resistance change near the output end of the channel caused by electron bombardment.

31593 Progress in the development of scintillating optical fibers. Borenstein, S.R.; Strand, R.C. (York College, C.U.N.Y., Jamaica, NY 11451). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 396-398(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Starting with 1 inch diameter PVT scintillator as a preform, the authors have drawn fibers of several diameters ranging from 1 to 4 mm. These fibers have been coated in line with the draw to form optical fibers. Several cladding materials whose index of refraction ranges from 1.35 to 1.55 have been used. The most successful fiber has been obtained with an extra thick (200 micron) cladding of silicone in combination with a linear draw, as opposed to a spool draw. This fiber is acceptable, but it is extremely fragile and its quality is difficult to control. The authors are currently constructing a 12 channel hodoscope with 1 mm spatial resolution using 4 mm diameter fibers. An account is also given of the progress made in using the Avalanche Photo Diode (APD) operated in the Geiger mode as the photo detector.

31594 High speed drift chamber readout system: TIRUS. Distelbrink, J.H.J.; Cottman, B.H. (Bates Linear Accelerator Center, Middleton, MA). *Nuclear Instruments and Methods in Physics Research;* **217**: No. 1/2, 351-356(15 Nov 1983). (CONF-830223—). Contract AC02-76ER03069.

From Wire chamber conference; Vienna, Austria (15 Feb 1983).

TIRUS (Time Interval Readout Using Scalers) is a fast and accurate, digital wire chamber readout system which is capable of operating under high background and high real count rate conditions. The system can be configured for a variety of experiments in medium energy physics, including multiple arm spectrometer setups. Drift time is measured directly by a 500 MHz counter for each wire. Timing resolution is 1 ns, readout speed is 30 to 60 ns per event and relative channel efficiency variation is less than 3%. No delay adjustments are necessary. Current results from a 28 wire prototype are presented.

31595 MPS II drift chamber system. Eiseman, S.; Etkin, A.; Foley, K.J.; Longacre, R.S.; Love, W.A.; Morris, T.W.; Ozaki, S.; Platner, E.D.; Polychronakos, V.A.; Saulys, A.C. (Brookhaven National Lab., Upton, NY). *Nuclear Instruments and Methods in Physics Research;* **217**: No. 1/2, 140-148(15 Nov 1983). (CONF-830223—).

From Wire chamber conference; Vienna, Austria (15 Feb 1983).

A description is given of a drift chamber system that has very good resolution and beam rate capabilities in a compact and reasonably priced package.

31596 Stereo, cylindrical drift chamber for muon decay experiments at LAMPF. Bolton, R.D.; Carlini, R.D.; Cooper, M.D.; Frank, J.S.; Hart, V.; Matis, H.S.; Mischke, R.E.; Sandberg, V.D.; Sennhauser, U. (Los Alamos National Lab., NM). *Nuclear Instruments and Methods in Physics Research;* **217**: No. 1/2, 173-180(15 Nov 1983). (CONF-830223—).

From Wire chamber conference; Vienna, Austria (15 Feb 1983).

A stereo, cylindrical drift chamber has been built for use in a search for rare decay modes of the muon at LAMPF. This chamber (part of the Crystal Box detector) has 728 cells on eight concentric annuli at alternating angles of 10° to 16° from the chamber axis and with radii from 105 to 220 mm. The basic cell cross section is (9x10) mm² and the inter-layer spacing is 4.7 mm. Preliminary results show the single wire efficiencies to be greater than 99%. Based on results obtained from prototype chambers, we hope to achieve 170 μm resolution (including multiple scattering) when TDC offsets and sense wire locations found in a careful inspection of the endplates are added to the track finding algorithm.

31597 Design of a lead glass drift calorimeter with MWPC detection. Perez-Mendez, V.; Mulera, T.; Del Guerra, A.; Hirayama, H.; Nelson, W.R. (Lawrence Berkeley Lab., CA). *Nuclear Instruments and Methods in Physics Research;* **217**: No. 1/2, 255-258(15 Nov 1983). (CONF-830223—). Contract AC03-76SF00098;AC03-76SF00515.

From Wire chamber conference; Vienna, Austria (15 Feb 1983).

A drift collection calorimeter having a combined radiator and field shaping structure made of lead glass tubing is described. A high resistance metallic layer is formed by reduction of the lead oxide at the surface of the glass and forms a continuous voltage divider for drift field shaping. The energy resolution of such a calorimeter is modeled, for several configurations, by the Monte Carlo technique.

31598 Dimethylether: A low velocity, low diffusion drift chamber gas. Villa, F. (Stanford Linear Accelerator Center, CA). *Nuclear Instruments and Methods in Physics Research;* **217**: No. 1/2, 273-276(15 Nov 1983). (CONF-830223—). Contract AC03-76SF00515.

From Wire chamber conference; Vienna, Austria (15 Feb 1983).

Excellent resolution (proportional16 μm) has been obtained using dimethylether [$(CH_3)_2O$] at 1 atm in a small drift chamber.

31599 Study of ageing effects in wire chambers. Adam, J.; Frandsen, P.K.; Hilke, H.J.; Hofmann, H.; Rosso, E.; Soria, D.; Vaughan, D. (European Organization for Nuclear Research, Geneva, Switzerland); Baird, C. (Queen Mary Coll., London, England); Cockerill, D. (Science and Engineering Research Council, Chilton, England); Ludlam, T. (Brookhaven National Lab., Upton, NY). *Nuclear Instruments and Methods in Physics Research;* **217**: No. 1/2, 291-297(15 Nov 1983). (CONF-830223—).

From Wire chamber conference; Vienna, Austria (15 Feb 1983).

Following the observation of deposits on an anode wire from the AFS central detector at the ISR some two years ago, systematic tests were carried out to establish the origin of the silicon, which was detected as a major component, and to possibly find techniques which could reduce this deposition process. In irradiated test chambers filled with Ar/C H_4 with and without methylal and

Ar/CO_2, gain reductions were observed, initially at proportional4%/10^{16} e/mm but increasing finally to proportional20%/10^{16} e/mm. High voltage instabilities occurred after about $2.3x10^{16}$ e/mm. The introduction of a cold trap, which should absorb heavier silanes, did not halt the ageing process, nor did prechambers with HV. Tests with a perspex chamber also showed ageing, but without silicon as a major component. Flat cathode chambers did not appear to age, at least to proportional15-20x10^{16} e/mm.

31600 **Measurement and simulation of the drift pulses and resolution in the micro-jet chamber.** Va'vra, J. (Stanford Linear Accelerator Center, CA). *Nuclear Instruments and Methods in Physics Research;* **217**: No. 1/2, 322-326(15 Nov 1983). (CONF-830223—). Contract AC03-76SF00515.

From Wire chamber conference; Vienna, Austria (15 Feb 1983).

We have tested a prototype of a micro-jet chamber, using both a nitrogen laser and a 10 GeV electron beam. The achieved resolution in the particle beam was sigma=18 μm for a 1 mm impact parameter and 22 μm when averaging over the entire beam profile. The experimental results were compared to a Monte Carlo program which simulates the pulse shapes and resolution in drift chambers of any geometry. The main emphasis in our simulation analysis was to study various timing strategies for drift chambers in order to achieve the best possible timing resolution.

31601 **Operational performance of a large liquid argon photon calorimeter.** Nelson, C.; Biel, J.; Droege, T.; Jonckheere, A.; Koehler, P.; Berg, D.; Chandlee, C.; Cihangir, S.; Ferbel, T.; Huston, J. (Fermi National Accelerator Lab., Batavia, IL). *Nuclear Instruments and Methods in Physics Research;* **216**: No. 3, 381-391(1 Nov 1983).

We describe the performance of a large (0.9x1.4 m^2) liquid argon photon calorimeter in high energy experiments at Fermilab. Resolutions for π^0 and electron showers, obtained under data-taking conditions, are compared with electron-beam calibration results. Exceptional spatial and time resolutions have been achieved for isolated showers (sigmasub(x,y)<0.7 mm and sigmasub(t)proportional6 ns). Electron data up to energies of 80 GeV and π^0 data up to 180 GeV are presented.

31602 **Low noise ionization chambers for use in transmission measurements with medium and high energy beams.** Bowman, J.D.; Carlini, R.; Damjanovich, R.; Mischke, R.E.; Nagle, D.E.; Talaga, R.L.; Harper, R.W.; Yuan, V. (Los Alamos National Lab., NM). *Nuclear Instruments and Methods in Physics Research;* **216**: No. 3, 399-404(1 Nov 1983).

We have investigated requirements for an integrating-type ion chamber that performs with signal fluctuations (noise) near the $1/\sqrt{N}$ counting statistics level. A large noise contribution occurs when the chamber collection foils intercept a beam of particles whose energy exceeds spallation production threshold. Experimental results demonstrate the source of this noise to be the production of low-energy spallation products in the plates and gas of the chamber. Delta rays also contribute to the noise, but not as severely. We have developed hydrogen-filled ion chambers with longitudinal collection plates that successfully eliminate the spallation contribution. With such chambers, noise improvement is typically a factor of 15 over chambers of conventional design.

31603 **Beam polarization at the ZGS.** Spinka, H.; Colton, E.; Ditzler, W.R.; Halpern, H.; Imai, K.; Stanek, R.; Tamura, N.; Theodosiou, G.; Toshioka, K.; Underwood, D. (Argonne National Lab., IL (USA)). *Nuclear Instruments and Methods in Physics Research;* **211**: No. 2/3, 239-261(15 Jun 1983).

With 93 refs.

A description is given of a beam polarimeter constructed for use at the Argonne ZGS and later at LAMPF. Details of the absolute calibration of these polarimeters are described. Conclusions for the absolute beam polarization at the ZGS impact a number of past polarized beam experiments, causing normalization changes in some cases of 8-25%. The normalization of some past pp polarization measurements are also affected by these results.

31604 **Real-time neutron beam monitor.** Becker, J.A. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). *Nuclear Instruments and Methods in Physics Research;* **211**: No. 2/3, 297-300(15 Jun 1983).

An array of multiwire proportional counters has been employed to image, in 'real-time', a collimated neutron beam produced at an electron linac facility. Test results are presented, along with a discussion of the advantages of this technique.

31605 **Proposal for a semiconductor high resolution tracking detector.** Rehak, P. (Brookhaven National Lab., Upton, NY (USA)). *Nuclear Instruments and Methods in Physics Research;* **211**: No. 2/3, 323-329(15 Jun 1983).

A 'new' concept for detection and tracking of charged particles in high energy physics experiments is proposed. It combines a well known high purity semiconductor diode detector (HPSDD) with a heterojunction structure (HJ) and a negative electron affinity (NEA) surface. The detector should be capable of providing a two dimensional view (few cm^2) of multi-track events with the following properties: a) position resolution down to a few μm (10^6 position elements); b) high density of information (10^2-10^3 dots per mm of minimum ionizing track); c) high rate capabilities (few MHz); d) live operation with options to be triggered and/or the information from the detector can be used as an input for the decision to record an event.

31606 (JINR—R-1,2,13-83-81, pp 24-29) **Investigation of drift chamber performances by means of cosmic particles.** Bozhko, N.I.; Borisov, A.A.; Vovenko, A.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij) (and others). 1983. (In Russian). NTIS (US Sales Only), PC A08/MF A01. Order Number TI84780157. (CONF-820192—).

From 3. working conference on IPHE-JINR neutrino detector; Dubna, USSR (18 Jan 1982).

Drift chamber performances determined with cosmic particles at a special bench including 8 drift chambers and 24 scintillation counters are considered. Electronics provide conversion of timing data into digital codes and data transmission to a computer. Data from drift chambers are processed with the assumption of a linear coordinate dependence on time. It is shown that for the tested system of drift chambers the efficiency plateau for signal voltage is 130-220 V, spatial resolution of a separate chamber is approximately 1 mm, angular resolution - 300 mrad, resolution of two adjacent tracks - 2.5-3 mm.

31607 (JINR—R-1,2,13-83-81, pp 46-58) **Magnetic system of the JINR-IHEP neutrino detector for Serpukhov synchrotron.** Anosov, V.A.; Bunyatov, S.A.; Vasilenko, A.T. (and others). 1983. (In Russian). NTIS (US Sales Only), PC A08/MF A01. Order Number TI84780157. (CONF-820192—).

From 3. working conference on IPHE-JINR neutrino detector; Dubna, USSR (18 Jan 1982).

Parameters, design and general arrangement of magnetic shell for a target part and a ring magnet of the neutron detector muon spectrometer are considered. The magnetic system was optimized for detecting muons from deep inelastic neutrino scattering on nucleons. The choice of the frame configuration of magnetic elements for the magnetic shell is stipulated. The muon detection efficiency in the magnetic system for the chosen geometrical parameters is calculated. The ring magnet module is tested for current loading, and magnetic measurements permitting determination of the reliability of the coil insulation and its mounting on the magnet core at current up to 1500 A are carried out.

31608 (JINR—R-1,2,13-83-81, pp 59-63) **Magnetic induction distribution in the JINR-IHEP neutrino detector magnetic shell and evaluation of scattering magnetic fields.** Kuznetsov, O.M.; Snyatkov, V.I. 1983. (In Russian). NTIS (US Sales Only), PC A08/MF A01. Order Number TI84780157. (CONF-820192—).

From 3. working conference on IPHE-JINR neutrino detector; Dubna, USSR (18 Jan 1982).

The calculation results for magnetic induction in a magnetic shell of the neutrino detector magnetic system are given. The module structure and design specific features of the magnetic shell are described. Distributions of scattering magnetic field components between two modules in the zone of photoelectron multiplier and drift chamber location are presented. It is shown that the chosen design version of magnetic shell module with a coil located on the lower magnet core girder is optimum.

31609 (JINR—R-1,2,13-83-81, pp 93-96) **Application of the (CH_2-C) difference method for neutrino interaction studies.** Mukhin, A.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1983. (In Russian). NTIS (US Sales Only), PC A08/MF A01. Order Number TI84780157. (CONF-820192—).

From 3. working conference on IPHE-JINR neutrino detector; Dubna, USSR (18 Jan 1982).

Possibility of application of the (CH_2-C) difference method in neutrino interactions to get the data on interactions on free protons for the IHEP neutrino detector being designed at the booster proton beam intensity is discussed. To realize the method it is proposed to install carbon (graphite) filters-targets between surfaces of scintillation counters.

31610 **High-speed motion neutron radiography.** Bossi, R.H.; Barton, J.P.; Robinson, A.H. (Oregon State University Department of Nuclear Engineering, Corvallis, Oregon 97331). *Nuclear Technology;* **59**: No. 2, 363-374(Nov 1982).

A system has been developed to perform neutron radiographic analysis of dynamic events having a duration of several milliseconds. The system has been operated in the range of 2000 to 10,000 frames. Synchronization has provided high-speed motion neutron radiographs for evaluation of the firing cycles of 7.62-mm munition rounds within a thick steel rifle barrel. The system has also been used to demonstrate its ability to produce neutron radiographic movies of two-phase flow. The equipment includes a TRIGA reactor capable of pulsing to a peak power of 3000 MW, a neutron beam collimator, a scintillator neutron conversion screen coupled to an image intensifier, and a 16-mm high-speed movie camera. The peak neutron flux incident at the object position is about 4 X 10^{11} n/cm^2 X s with a pulse, full-width at half-maximum, of 9 ms. Modulation transfer function techniques have been used to assist optimization of the system performance. Special studies have been performed on the scintillator conversion screens and on the effects of statistical limitations on information availability.

31611 **(LA-tr—82-5) Radioactive aerosol air contamination monitor (MAFF).** Micheletti, L.; Dufayet, J.P. Translated from *Analusis ;* **8**: No. 10, 473-477(1980). Contract W-7405-ENG-36. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82014223. DE82014223

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The MAFF is a highly sensitive monitor designed to measure and signal accidental air contamination at values well below those generally detectable, allowing for high-amplitude variations due to radon daughter products. It consists of a standard electronic rack, which has been designed for use under highly varied conditions: detection of α, β, x radiation, number of independent channels (from 1 to 4), internal or external suction pump, internal or external threshold processing, on-line computer, or self-contained operation. Air is drawn in continuously through a stationary filter paper by a single pump. Each channel includes a scintillation detector and photomultiplier, and delivers an output signal proportional to the activity of the radionuclides trapped by the filter. The single-channel version is equipped with an oversize scintillator and photomultiplier with very high sensitivity. The electronic equipment consists of plug-in units which are selected according to each configuration. The control and display section includes a large number of safety systems which guarantee high equipment operating reliability. The MAFF is currently used in several reactors and hot laboratories.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

REFER ALSO TO CITATION(S) 30514, 30830, 31433, 31573, 31580

31612 **(JINR—6-83-454) Perturbation of gamma-gamma angular correlations in magnetic-tape carriers.** Morozov, V.A.; Budzynski, M.; Kochetov, O.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1983. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701885.

Perturbation of angular corerelations of gamma-gamma cascades (1274-123), (873-123) and (757-248) keV of ^{154}Gd in aluminium and BASF and SCOTCH magnetiC tapes have been investigated. Radioonactive ^{154}EU has been implanted into the tapes by means of the electromagnetic mass-separator with the acceleration potential Vsub(acc)=75 kV. The dose of implanted ions was cc $3x10^{13}$ ions/cm^2. As a result, integral attenuation factors for angular correlations G(infinity) and effective magnetic fields which effect on nuclei of the ^{15}H^{4}Gd admixture in BASF and SCOTCH tapes Hsub(eff) (BASF)=-2.9(3) Tl and Hsub(eff)(SCOTCH)=-2.6(3) Tl are determined.

31613 **(SAND—84-0378C) Radiation effects in TaSi/sub x//polysilicon gate structures.** Draper, B.L. (Sandia National Labs., Albuquerque, NM (USA)). 1984. Contract AC04-76DP00789. 26p. (CONF-8405160—1-Abst.). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011683.

From Refractory metal silicide workshop; San Juan Bautista, CA, USA (14 May 1984).

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The response to radiation of an MOS structure fabricated with a TaSi/sub x//poly gate may be different than that of a standard polysilicon gate device; it is still not clear whether this behavior is significantly worse in the TaSi/sub x/ devices. Minimizing mechanical stress, exposure of the gate oxide to high temperatures, and possible contamination sources should help to reduce these differences. The most encouraging result of this study has been the absence of any observed large dose enhancement effect - at least on capacitors.

4403 Miscellaneous Instruments

REFER ALSO TO CITATION(S) 30185, 30430, 30593, 30817, 32248

31614 **(AD-B—020651/6) Solid electrolyte oxygen sensor for aircraft hazard protection applications. Final report, 26 Jan-26 Nov 76.** Welsh, L.B.; Szofran, F.R. (UOP, Inc., Des Plaines, IL (USA)). Mar 1977. 90p. NTIS, PC A05/MF A01.

See also report dated October 1975, AD-B0083631.

This program, Solid Electrolyte Oxygen Sensor for Aircraft Hazard Protection Applications, is concerned with the development of experimental oxygen sensing devices using solid electrolyte films. A large number of these devices have been assembled using rf-sputter deposited solid electrolyte films of 8 mole percent yttria-doped zirconia and studied to determine their physical properties and sensing performance. By varying the deposition conditions of both the solid electrolyte films and the electrodes on the films, optimal deposition conditions have been identified. These devices generate an EMF which is quite sensitive to the oxygen partial pressure in the ambient gas. Various devices have been tested extensively to determine the sensor response time to a change in the oxygen partial pressure, the stability of sensor output, the effect of temperature on the sensing performance, and sensor behavior in the presence of contaminant gases. Response times, for an increase in the oxygen partial pressure, of less than one minute are obtained with a typical sensor operated at 150 C. Stable performance over extended periods of time appears to be feasible based on the results of limited lifetime testing. In the presence of contaminant gases, sensor output is altered. In some cases (propane), exposure to the contaminant gas enhances sensor performance. In no case is the sensing performance destroyed by exposure to the contaminants used in this program.

31615 **(FEI—1407) TsPUP-1 digital converter of angular displacements.** Zabelin, V.K.; Zakharov, O.P.; Rusakov, L.G.; Safonov, L.N.; Seredkin, Yu.V.; Sotnikov, A.F. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1983. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701893.

Digital converter of angular displacements, connected with control computer by means of CAMAC system is described. The converter is designated for installation on X-ray diffractometers for study of monocrystal samples, as well as for other accurate angular displacement measurements. Twenty-discharge converter is based on inductosin (accurate reading transducer) and rotary transformer (approximate reading transducer). Brief description of design and electronic circuits are given. Converter parameters are the following: the accuracy of angUlar displacement measurement is not more than +-5 angUlar seconds in +-180 deg range; measurement cycle - 6 ns. Devices of angle visualization, made on light-diode indicators and presenting measured angle in degree-decimal form, 125-369 deg for example, are available.

31616 (IAEA-TECDOC—280, pp 63-71) **Role of microprocessors in nuclear instrumentation.** Gallice, P. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France). Dept. d'Electronique et d'Instrumentation Nucleaire). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

Like all the other kinds of electronic instruments, nuclear instrumentation has been more and more designed with built-in microprocessors, which give elaborated computed results in terms of user's units, control the sequence of successive tasks and introduce parallel actions in distributed systems. Compared to previous logic design, instrument dialog is better, recording facilities are increased and the price becomes lower. Microprocessors allow for a sophisticated self-made instrumentation by a small team, but this requires powerful tools for hardware and software debugging facilities, as well as a good knowledge. Three typical examples of applications are given: a nuclear counting automat, a programmable instrument and a simple distributed system.

31617 (IAEA-TECDOC—280, pp 197-224) **LABEN's view of the design of data acquisition and processing systems to be used in developing countries.** Casoli, P.; Hamel, M. (LABEN, Div. della SI.EL.S.p.R., Milan (Italy)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

This paper is a review of some of the problems related to the instrumentation for acquisition and data processing for laboratories in developing countries. As well as the failures by "standard conditions", attention is paid to possible malfunctions depending on particular environmental conditions in developing countries. LABEN has already connections with developing countries, and training programmes are also taken into consideration. A relevant part of this paper are LABEN's recent developments in acquisition and processing of nuclear data.

31618 (IAEA-TECDOC—280, pp 225-242) **Data acquisition and reduction systems for nuclear data experiments.** Thompson, K.R.; Maier, W. (Nuclear Data, Inc., Schaumburg, IL (USA)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

The current Nuclear Data Multichannel Analyzer product line is reviewed, and some projections made concerning future MCA systems. The Family of Sixes is a complete family of MCAs spanning capability from a portable battery-powered unit to multi-input, multiple-user programmable data acquisition and reduction systems. Future systems will incorporate more capabilities at the same price. We also discuss some considerations relating to the sale, service and support of systems in the developing countries. These considerations indicate that a single, volume buyer for such systems would be of significant advantage.

31619 (IAEA-TECDOC—280, pp 243-267) **Data acquisition and analysis systems. "Tools of the Trade".** Wilson Renner, K.L. (EG and G ORTEC, Oak Ridge, TN (USA)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

EG and G ORTEC is a major supplier of nuclear instrumentation for university research centres, national laboratories, nuclear power plants and research centres in developed and underdeveloped countries throughout the world. Among the company's state-of-the-art products are a broad line of semiconductor radiation detectors with a supporting line of electronics and computer-based systems embracing all functions of signal processing, data acquisition and data analysis. EG and G ORTEC has sponsored production and distribution of a wide variety of application notes and technical publications to help others to learn of the latest techniques in the use of nuclear instrumentation. The worldwide field offices and service and training centres coupled with the in-house support provides an effective network to support the high-technology product line.

31620 (IAEA-TECDOC—280, pp 269-283) **Recent developments in microprocessor-based data systems.** Burley, A.C. (Nuclear Enterprises Ltd, Beenham (United Kingdom)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

Nuclear Enterprises Limited manufacture a broad range of nuclear instruments. The paper describes some of the typical products, including a newly developed multichannel analyzer, and a data acquisition system based on a desk computer. Some information is presented on a complete microprocessor controlled personnel monitor, and on several systems used in life sciences.

31621 (IAEA-TECDOC—280, pp 285-300) **Canberra view of nuclear data acquisition and analysis.** Bernhardt, W. (Canberra, Vienna (Austria)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

Canberra manufactures a complete line of nuclear modular instruments, solid state radiation detectors and a multiplicity of data acquisition devices. The paper describes the most typical products: different series of multichannel analyzers, as well as complete computer-based systems. The available software is also listed.

31622 (IAEA-TECDOC—280, pp 73-91) **Techniques for data acquisition and data analysis.** Owen, E.C.G. (Daresbury Lab. (UK)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

Methods of performing data acquisition and data analysis are described using equipment manufactured to international standards such as CAMAC, NIM and FASTBUS. A logical approach to the definition and creation of systems against a particular experimental requirement is suggested, and the software requirements of such systems are examined.

31623 **(IAEA-TECDOC—300) Sample preparation techniques in trace element analysis by X-ray emission spectroscopy.** Valkovic, V. (International Atomic Energy Agency, Vienna (Austria)). Nov 1983. 188p. NTIS (US Sales Only), PC A09/MF A01. Order Number DE84701895.

The report, written under a research contract with the IAEA, contains a detailed presentation of the most difficult problem encountered in the trace element analysis by methods of the X-ray emission spectroscopy, namely the sample preparation techniques. The following items are covered. Sampling - with specific

consideration of aerosols, water, soil, biological materials, petroleum and its products, storage of samples and their handling. Pretreatment of samples - preconcentration, ashing, solvent extraction, ion exchange and electrodeposition. Sample preparations for PIXE - analysis - backings, target uniformity and homogeneity, effects of irradiation, internal standards and specific examples of preparation (aqueous, biological, blood serum and solid samples). Sample preparations for radioactive sources or tube excitation - with specific examples (water, liquid and solid samples, soil, geological, plants and tissue samples). Finally, the problem of standards and reference materials, as well as that of interlaboratory comparisons, is discussed.

31624 (INIS-mf—8961, pp 318-327) **Improved design of magnetoinduction densimeter and γ-absorptiometer.** Parus, Yu.; Sverchin'ska, Z.; Otrembski, Yu.; Kezhek, J. 1981. (In Russian). NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780260. (CONF-8104231—Vol.1).

From 5. CMEA symposium on investigations in the field of reprocessing of irradiated fuel and radioactive wastes disposal; Marianske Lazne, Czechoslovakia (7 Apr 1981).

Original system has been described of a voltage amplitude regulator. This system permits to make higher the speed of getting the state of dynamic equilibrium by the vibration element of a densimeter, both in switching in the device into electric network and during operation when measuring density of the liquid to be investigated. The regulator has been constructed with application of a diode-resistor voltage divider which is controlled by means of power source which is working in the feedback circuit. This power source has output which depends on the outlet signal. Change in the correlation in the voltage distribution on the divider results to the corresponding change in the amplification factor of the output amplifier. Synchronization of control of band-pass of standard high frequency pulses, which has been used in the digital part of the system as well as changed circuit for control of the measuring cycle permits to conduct automatic start of the device as well as has prevented from spontaneous manual change of tuning of measuring cycle during automatic regime of operation. A new transducer has been developed for measuring conductivity. It consists of a straight piece of tube made of the acid resistant steel and having a ceramic tube which is sealed-in as an insulator. Electric circuit of the transducer is closed through a liquid which is filling the tube and the outer case of the transducer. The outer case is made of iron. Besides this, an improved system has been used for compensation of the temperature of solution. This system consists of an operation amplifier which is placed in the outlet of the DC amplifier. As a transducer for changes of temperature the linear thermistor has been used.

31625 (INIS-SU—212, pp 64-69) **Base principles of high-current mass-spectrometry.** Pakulin, V.N. (Agrofizicheskij Nauchno-Issledovatel'skij Inst., Leningrad (USSR)). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780224.

In General and nuclear physics.

Schemes of magnetron, inverse-magnetron and magneto-discharge mass-spectrometers the sensitivity of which is 10^3-10^4 times higher than in existing devices are analysed. Current increase is achieved by using converting, cylindric beams between two coaxial cylinders for analysis. Theoretically considered are conditions for cutting-off the effect of inhomogeneity of the magnetic field that affect the resolution value in inverse-magnetron mass-spectrometers, as well as the distribution of charge density and electric field in magnetic discharge mass spectrometrs. The maximum application of high-current mass-spectrometers can be found in vacuum technology and as portable gas analyzers.

31626 (ITEF—4(1983)) **Measurement and analytic representation of the magnetic field of 6-m ITEP spectrometer.** Bolonkin, B.V.; Gachurin, V.V.; Gordeev, A.M.; Grigor'ev, V.K.; Katinov, Yu.V.; Kondrat'ev, L.N.; Moiseenko, O.Ya.; Nozdrachev, V.N.; Porubaj, N.I.; Sokolovskij, V.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1983. 31p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701883.

Measurement procedure of the magnetic field of 6-m ITEP spectrometer using three component Hall detector on-line with PDR-15 computer has been described. Calibration of the detector is carried out using nuclear magnetic resonance. The volume of the field measured is 11.50x1.28x0.68 m. Values of induction vector components when magnetic current has a fixed value have been measured in 150 thousand points. The measurements are made at three values of magnet current. Mean-square statistical error of the measurements does not exceed (4-6)x10^{-4} T. Programs permitting to operatively control working order of electron equipment, the quality of information obtained during measurements and programs for data processing are described. The magnetic field measured is approximated with three-dimensional harmonic functions with mean square error not exceeding 5x10^{-4} T over the whole field volume measured.

31627 (JINR—R-13-83-355) **Remote controlled magnetometer to measure homogeneous magnetic field.** Bienkowski, A.; Tkachenko, S.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1983. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701742.

Remote controlled device intended for measuring the magnetic induction of homogeneous magnetic field is described. 0.15-0.94 T induction range was measUped with one field detector, 1x10^{-5} T accuracy is achieved. Principle of operation is based on using nuclear magnetic resonance. When designing the device a particular attention was paid to receiving a high ratio signal/noise. The NMR signal/noise ratio throughout the total range is above 10:1.

31628 (RL—83-010) **Rutherford Appleton Laboratory symposium on new techniques in x-ray and xuv optics, 29th-30th July 1982, Abingdon.** Kent, B.J.; Patchett, B.E. (eds.). (Scientific and Technical Studies, London (UK)). 1983. 157p. (CONF-8207106—). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84780163.

From Symposium on new techniques in X-ray and XUV optics; Abingdon, UK (29 Jul 1982).

A separate abstract was prepared for one paper in this symposium. (LEW)

31629 (UCRL—50025-84-1, pp 7-14) **New rotating turbine camera controller that extends capability and improves reliability.** Coradetti, T. Apr 1984. NTIS, PC A03/MF A01. Order Number TI84011526.

In Electronics Engineering Department EE technical review.

A new microcomputer-based, real-time, camera-control system has been installed in B Division's Hydrodiagnostic Test Facilities. The system uses a DEC LSI-11/23 to control angular velocities of up to eight rotating-turbine mirrors and drive a color graphic speed display. A new adaptive control algorithm handles changes in configuration of cameras, rotors, and operating regimes for different experiments. Processing is distributed to subordinate 8085 microprocessors, each of which is dedicated to one pair of cameras. The system facilitates preparation for experiments, assists in collection of postshot data, and maintains a database for rotor quality assurance.

31630 **Comments on "The optimization of electronic precision in ultrasonic velocity measurements: A comparison of the time interval averaging and sing around methods" [J. Acoust. Soc. Am. 73, 1833—1837 (1983)].** Karplus, H.B. (Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439). *Journal of the Acoustical Society of America;* **75**: No. 6, 1909-1909(Jun 1984).

J. D. Aindow and R. C. Chivers [J. Acoust. Soc. Am. 73, 1833 (1983)] compared the precision of the direct "time-of-flight" technique with the "sing-around" method for sound velocity measurement. Their conclusion is changed by the newer, faster, commercial clocks (2 ns HP5345<0.1 ns HP5370), giving the advantage to the time of flight method. The analysis is herewith augmented by calculating the time jitter in terms of signal to noise ratio, which was correctly shown to be negligible with 100-ns clocks, but becomes increasingly more significant with faster clocks.

31631 **Renaissance of x-ray optics.** Underwood, J.H.; Attwood, D.T. (Center for X-Ray Optics, at Lawrence Berkeley Laboratory, California). *Physics Today;* **37**: No. 4, 44-61(Apr 1984). Contract AC03-76SF00098.

New optical elements such as multilayer mirrors and zone-plate lenses allow the extension of imaging and holography techniques to the spectral region below 300 A.

31632 **Beam deflecting optical switch using volumetric thermal gratings.** Goldhar, J. (University of California, Lawrence Livermore National Laboratory, P.O. Box 5508, Livermore, California 94550). *Applied Optics;* **23**: No. 1, 113-118(1 Jan 1984).

Volumetric thermal gratings were created in liquid and gaseous media and were used to efficiently deflect laser beams. In gaseous media, a low-input energy requirement and high switching efficiency make this type of switch a good candidate for a practical device. The switch is scalable to large apertures and has low insertion loss.

31633 **X-ray transmission photocathode sensitivities at λ = 0.266 μm.** Rockett, P.D. (KMS Fusion, Inc., P.O. Box 1567, Ann Arbor, Michigan 48106). *Applied Optics;* **23**: No. 1, 176-179(1 Jan 1984). Contract AC08-82DP40152.

The absolute sensitivity of two soft x-ray stream camera transmission phtocathodes was measured at λ = 0.266 μm. The photocathodes were mounted in a Lawrence Livermore National Laboratory soft x-ray streak camera and were compared in sensitivity to a more conventional UV photocathode. Measurements were performed with a 30-psec 0.266-μm pulse from a frequency-quadrupled glass laser. The study revealed photocathode substrate transmission at 0.266 μm, miniumum UV energy density requirements, temporal response, and an estimate of streak camera dynamic range for UV exposure.

31634 **Four-rod carbon rod atomizer for atomic absorption spectrometry.** Slemer, D.D. (Exxon Nuclear Idaho Co., Idaho Falls). *Analytical Chemistry;* **54**: No. 9, 1659-1663(Aug 1982).

The qualitative and quantitative effects that changes in atomizer configuration, mode of power application, and the presence of matrix concomitants have on the response of the atomic absorption spectrometer are reported. Detailed discussion of the modification of a carbon rod atomizer (CRA) workhead is included. Both matrix-free and hard-water concomitant 0.1ppM lead solutions were used as test materials for comparison of the modified equipment. The data indicate that a great deal of improvement in the analytical utility of the CRA atomizer can be easily accomplished by going to a 4-rod, long tube, tube-end-sensed-temperature-feedback-controlled system. In actual use, the conventional furnace configuration proved to be superior to the modified CRA when an absolutely maximum volatilization temperature was required.

31635 **(LA-tr—82-23) Calculation of the useful width of a system of two concave gratings mounted at grazing incidence.** Jaegle, P. Translated from *Journal de Physique (Orsay, France) ;* **24**: No. 3, 179-186(Mar 1963). Contract W-7405-ENG-36. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE82016822. DE82016822

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This article investigates the possibility of increasing the resolving power of ultrasoft x-ray spectrographs by using a system of two concave gratings working at grazing angle. The distribution of brightness in the images given by this system from a point source is calculated. The useful width of the system is deduced and a comparison is made with the case of a single grating.

45 EXPLOSIONS AND EXPLOSIVES

4501 Chemical

31636 **(MHSMP—84-19) Carbon-13 analysis and characterization of the isolated products present in the preparation of HNS.** Clink, G.L. (Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (USA)). May 1984. Contract AC04-76DP00487. 9p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012997.

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In the HNS preparative process several other compounds are produced which are of analytical interest. The carbon-13 NMR analysis and characterization of these materials, including HNS, are reported.

31637 **(MLM—3153(OP)) Nuclear magnetic resonance kinetic study of the intramolecular rearrangement of 2-(5-cyanotetraazolato)pentaammine cobalt (III) perchlorate.** Pitre, E.M.; Attalla, A. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1984. Contract AC04-76DP00053. 16p. (CONF-8404153—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012397.

From 11. annual meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers; Houston, TX, USA (25 Apr 1984).

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The activation energy, E/sub a/, for the intramolecular rearrangement of the secondary explosive transition metal coordination compound 2-(5-cyanotetraazolato)pentaammine cobalt (III) perchlorate (CP) to its amidine complex was determined by variable temperature nuclear magnetic resonance (NMR) spectroscopy. A 30 wt % concentration of CP dissolved in deuterated dimethylsulfoxide ($DMSO-d_6$) was heated at five different temperatures for sufficient time to effect its transformation to the amidine complex. A specific reaction rate constant, k, was determined at each temperature from the rate of rearrangement of CP(d[amidine]/dt). Temperatures ranged from 60° to 100°C in 10° increments. Transformations above 100°C were too rapid to collect accurate data and too slow below 60°C, requiring long collection periods. The Arrhenius relationship [(k = Aexp(-E/sub a//RT)] was applied to a plot of log k versus reciprocal absolute temperature where the slope is -E/sub a// 2.303R and the activation energy was obtained. The variable temperature NMR method, as well as the analytical techniques used to obtain the kinetic data, are presented, and the final results are discussed.

31638 **(MLM—3154(OP)) Analysis of the post detonation environment of an explosives test firing chamber.** Yelton, R.O.; Hughes, B.M.; Mazer, S.M. (Monsanto Research Corp., Miamisburg, OH (USA). Mound). 1984. Contract AC04-76DP00053. 2p. (CONF-8405185—1). NTIS, PC A02/MF 01; GPO Dep. Order Number DE84012425.

From 32. annual conference on mass spectrometry and allied topics; San Antonio, TX, USA (27 May 1984).

Samples of explosion debris collected inside the test fire tank after an ambient shot of TATB and a sub-ambient shot, were analyzed by capillary GC/MS. Phenol, dimethylbenzene, and several carboxylic acids and phthalates were identified. These compounds were determined to be of low toxicity. An in-vitro Chinese hamster ovary clonal cyclotoxicity assay confirmed the low toxicity. (DLC)

31639 **(LA-tr—83-5) Study of PETN initiation conditions by ultra-fast Raman spectrometry.** Tailleur, M.H.; Cherville, J. Translated from *Propellants, Explosives, Pyrotechnics ;* **7**: 22-27(1982). Contract W-7405-ENG-36. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012559. DE84012559

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Ultra fast Raman spectrometry allows to study the very short phenomena which led to the generation of detonation in secondary explosives. According to an earlier theoretical study on nitrated explosives, the decomposition reaction excited by shock begins at the $R.NO_2$ bond. We verified experimentally two conclu-

sions of this theoretical study: the phase change under shock of PETN and modifications under shock of electronic structure involving one of the $O.NO_2$ bond. A study on PETN monocrystals by classical Raman spectrometry has been carried out in order to obtain a complete assignment of the spectrum. At the same time, we observed splittings of the polar modes caused by the absence of an inversion center in the crystal lattice. The experimental study required a special set-up of the Raman equipment to measure important intensity variations of some lines at a fixed shock pressure in addition to the slight frequency shifts.

4502 Nuclear

REFER ALSO TO CITATION(S) 31402

31640 **(LA-UR—84-1523) Little Boy neutron spectrum below 3 MeV.** Evans, A.E.; Bennett, E.F.; Yule, T.J. (Los Alamos National Lab., NM (USA); Argonne National Lab., IL (USA)). 1984. Contract W-7405-ENG-36. 11p. (CONF-840627—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012631.

From 29. annual meeting of the Health Physics Society; New Orleans, LA, USA (3 Jun 1984).

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The leakage neutron spectrum from the Little Boy replica has been measured from 12 keV to 3 MeV using a high-resolution ^{3}He ionization chamber, and from 1 keV to 3 MeV using proton-recoil proportional counters. The ^{3}He-spectrometer measurements were made at distances of 0.75 and 2.0 m from the active center and at angles of 0°, 45°, and 90° with respect to the axis of the assembly. Proton-recoil measurments were made at 90° to the assembly axis at distances of 0.75 and 2.0 m, with a shielded measurement made at 2.0 m to estimate background due to scattering. The ^{3}He spectrometer was calibrated at Los Alamos using monoenergetic ^{7}Li(p,n)^{7}Be neutrons to generate a family of response functions. The proton-recoil counters were calibrated at Argonne by studying the capture of thermal neutrons by nitrogen in the counters, by observation of the 24-keV neutron resonance in iron, and by relating to the known hydrogen content of the counters. The neutron spectrum from Little Boy was found to be highly structured, with peaks corresponding to minima in the iron total neutron cross section. In particular, influence of the 24-keV iron window was evident in both sets of spectra. The measurements provide information for dosimetry calculations and also a valuable intercomparison of neutron spectrometry using the two different detector types. Spectra measured with both detectors are in essential agreement. 8 references, 7 figures, 2 tables.

31641 **(LA-UR—84-1723) Neutron and gamma-ray dose-rates from the Little Boy replica.** Plassmann, E.A.; Pederson, R.A. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 8p. (CONF-840627—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012587.

From 29. annual meeting of the Health Physics Society; New Orleans, LA, USA (3 Jun 1984).

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We report dose-rate information obtained at many locations in the near vicinity of, and at distances out to 0.64 km from, the Little Boy replica while it was operated as a critical assembly. The measurements were made with modified conventional dosimetry instruments that used an Anderson-Braun detector for neutrons and a Geiger-Mueller tube for gamma rays with suitable electronic modules to count particle-induced pulses. Thermoluminescent dosimetry methods provide corroborative data. Our analysis gives estimates of both neutron and gamma-ray relaxation lengths in air for comparison with earlier calculations. We also show the neutron-to-gamma-ray dose ratio as a function of distance from the replica. Current experiments and further data analysis will refine these results. 7 references, 8 figures.

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC

5001 Basic Studies

31642 **(CNEN-RT/PROT—81-23) Method for evaluation of atmospheric stability: application to the Casaccia site.** Cagnetti, P.; Ferrara, V.; Marri, P.; Racalbuto, S. (Comitato Nazionale per l'Energia Nucleare, Casaccia (Italy). Dipartimento Radiazioni e Ricerche di Sicurezza e Protezione). Sep 1981. 57p. (In Italian). NTIS (US Sales Only), MF A01. Order Number DE84901161.

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In the following a general method is shown starting from Pasquill's and Turner's suggestions in order to evaluate frequencies of the various stability categories of the lower layers of the atmosphere. Some tables about stability categories distribution have been carried out for the Casaccia site, according to: wind direction time, of the day, and season, so that it is possible to characterize better the diffusive atmospheric properties of the site. 7 references, 14 figures.

31643 **(LA-UR—84-1415) Climatic change and streamflow in the southwest.** Osborn, H.B.; Lane, L.J. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 11p. (CONF-840744—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012658.

From American Society of Civil Engineers Irrigation and Drainage Div. specialty conference; Flagstaff, AZ, USA (24 Jul 1984).

Extreme variability between summer rainfall seasons in the 1880's, followed by a summer drought in the 1890's and early 1900's, possibly combined with the influx of cattle to the region in the 1880's, may have significantly altered the range and basin ecosystems in southern Arizona and much of the Southwest. A small, but possibly meaningful, decline in summer rainfall, along with a more stable winter precipitation plus continued pressure from grazing, is the most likely explanation for continued deterioration of the rangelands. The large number of recent damaging floods on the Santa Cruz River is mostly the result of the greater incidence of fall storms, rather than a change in basin and channel characteristics. For the period 1956-1980, annual flood peaks for the San Pedro River were not correlated to flood peaks from the USDA-ARS Walnut Gulch Experimental Watershed, a small subdrainage of the San Pedro, suggesting that long-term streamflow records on major basins are not helpful in determining the representativeness of shorter records from southeastern Arizona. 21 references, 6 figures, 2 tables.

31644 **(NUREG/CR—3670) Violent tornado climatography, 1880-1982.** Grazulis, T.P. (Environmental Films, Inc., St. Johnsbury, VT (USA)). May 1984. Contract AC06-76RL01830. 167p. (PNL—5006). NTIS, PC A08/MF A01; 1 - GPO; GPO Dep. Order Number DE84012160.

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All known information sources, ranging from newspaper reports to the University of Chicago (DAPPL) and National Oceanic and Atmospheric Administration (NOAA/NSSFC) data lists, were utilized to produce a self-consistent compilation and description of violent tornado occurrences in the contiguous United States for the years 1880 through 1982. The 969 F-scale 4 and 5 tornadoes comprise the most complete and rational data base available for studies elated to violent tornado risk assessment; the data provide improved bases for licensing decisions and development of standards in safety at nuclear facility sites. Reconciliation of the DAPPL and NSSFC data lists for violent tornadoes has been achieved. Analysis of the data shows geographical and temporal variability of tornado occurrences; suggestions are given to help account for nonuniform distributions, and other suggestions are made for needed future research. 32 references, 14 figures, 8 tables.

31645 **(TTKK-LT—29) Computer program, in fortran 4-plus, for one-dimensional heat and moisture movement in the ground with and without any artificial heat sinks or sources.** Tarnawski, W. (Tampere Univ. of Tech. (Finland)). 1983. 39p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84751465.

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The program solves the one dimensional heat and moisture flow problem in unfrozen and partially frozen soils, adjacent to a cylindrical, horizontal ground heat collector of a heat pump unit. Two different kinds of soils, silt and sand, are taken into consideration. The simple ground heat pump model takes into account Finnish weather conditions, heat requirements and cooperation with a solar collector. The model includes the phase change phenomenon, heat and moisture migration. The solution of the mathematical model is based on a finite difference formulation. The nonlinearity of the problem and the nature of initial and boundary conditions of the third kind dictated the use of a numerical three-time level implicit finite-difference scheme to obtain a solution. This scheme is unconditionally stable and convergent. The heat and flow properties of soils are evaluated at the intermediate time level. The complications of solving a set of nonlinear algebraic equations at each time step are avoided. The coefficients of the set of simultaneous equations for a given time increment form a tridiagonal matrix. For this type of matrix, the special adaptation of the Gaussian elimination procedure is used. This method is very efficient and suitable for automatic computation. The program contains a main part (MAIN), 11 subroutines and 4 files for input data.

5002 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 30170, 30175, 30179, 30223, 30491, 31458, 31467, 31798, 31799, 31809, 31816, 31869

31646 **(ANL—82-65-Pt.3) Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.** (Argonne National Lab., IL (USA)). Sep 1983. Contract W-31-109-ENG-38. 78p. NTIS, PC A05/MF A01. Order Number DE84001670.

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This is the annual report of the Radiological and Environmental Division of the Argonne National Laboratory for 1982. Studies of the effects of ozone on crop growth and yield have been carried out by the Terrestrial Ecology Group for winter wheat and for sorghum. The Microcosms for Acid Rain Studies (MARS) facility was completed in the early summer. Controlled investigations of plant and soil responses in acid rain were initiated with crop plants grown in two different midwestern soil types. The Transuranics Group has found that the solubility and adsorptive behavior of plutonium previously observed at fallout concentrations in natural waters ($\sim 10^{-16}$ to 10^{-18} M) is applicable at plutonium concentrations as high as 10^{-8} M. The Lake Michigan eutrophication model has been adapted to operation in a Monte Carlo mode. Simulations based on yearly phosphorus loadings and winter conditions were selected at random from prescribed probability distributions and used to estimate some of the uncertainties associated with model forecasts of Lake Michigan water quality.

31647 (ANL—82-65-Pt.3, pp 20-26) **Impact of ozone on yield of three cultivars of winter wheat.** Kress, L.W.; Smith, H.J.; Miller, J.E. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

This study was initiated to examine the regression relationship between yield of three important cultivars of soft red winter wheat and chronic exposure to ambient or simulated ambient O_3 concentrations. 4 references, 3 figures, 1 table.

31648 (ANL—82-65-Pt.3, pp 27-30) **Impact of ozone on yield of grain sorghum.** Kress, L.W.; Smith, H.J.; Miller, J.E. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

This study examined the relationship between yield of sorghum and chronic exposure to ambient or simulated ambient O_3 concentrations. 3 references, 1 figure, 1 table.

31649 **(CONF-830587—2) Automated methodology for assessing inhalation exposure to hazardous waste incinerator emissions.** O'Donnell, F.R.; Holton, G.A. (Oak Ridge National Lab., TN (USA)). 1983. Contract AC05-84OR21400. 10p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012338.

From 9. annual research symposium on land disposal, incineration and treatment of hazardous waste; Ft. Mitchell, KY, USA (2 May 1983).

The Inhalation Exposure Methodology (IEM) is a system of computer programs developed to estimate atmospheric transport and population exposure to airborne pollutants released from hazardous waste incinerators. This paper outlines the capabilities of IEM and discusses operation of the version installed on the IBM system at the National Computer Center, Research Triangle Park, North Carolina. Important factors affecting IEM exposure estimates are discussed. A six-site comparison shows total exposed population estimates made using two other methods to differ from IEM estimates by between -13 and +9%. Corresponding exposure estimates show differences between -36 and +35%. 6 references, 2 figures, 2 tables.

31650 **(CONF-8305200—1) Pollutant deposition in mountainous terrain.** Lovett, G.M. (Oak Ridge National Lab., TN (USA)). 1983. Contract AC05-84OR21400. 17p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012350.

From Symposium on the Southern Appalachian spruce-fir ecosystem: status, threats, and management; Gatlinburg, TN, USA (1 May 1983).

Theoretical considerations suggest that the high elevation forests in mountainous areas receive substantially more atmospheric deposition than do the forests of the surrounding lowlands. Wet deposition should increase with elevation because of orographic enhancement of precipitation and increased deposition of snow, which may be more polluted than rain. Dry deposition should be greater in high-elevation forests because of greater wind speeds, higher relative humidities, greater surface area of vegetation present during the entire year, and greater filtering efficiency of needles compared to broad leaves. Somewhat lower concentrations of airborne particles and gases at remote high elevation sites may act to diminish the elevational increase of dry deposition to some extent. In addition to increased wet and dry deposition, cloud water deposition is likely to be significant at high elevations because of the frequent presence of wind-driven clouds. At low elevations, clouds and fogs are probably negligible as a deposition vector because they occur less frequently and are usually associated with still air. Experimental verification of these expected trends is not easily found, but studies on cloud water deposition and lead accumulation suggest their accuracy. Additional data on air quality, meteorology, and precipitation chemistry are needed for high elevations before atmospheric deposition of any airborne substance can be determined with certainty. 31 references.

31651 **(CONF-8405169—1) Formaldehyde: an important indoor pollutant.** Hawthorne, A.R.; Matthews, T.G. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 8p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012331.

From Electric Power Research Institute indoor air quality workshop; Denver, CO, USA (1 May 1984).

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Formaldehyde is an important pollutant in determining the acceptability of indoor air quality. Concern over both acute and chronic health effects have led to the desire to minimize the exposure of the public to this substance. Numerous sources exist within the indoor environment. The emission rates of many of these sources are dependent on environmental parameters. Field measurements of residential levels of formaldehyde indicate that some homes, especially mobile homes and new homes with pressed-wood materials, are likely to frequently exceed the 0.1-ppM concentration guideline. A variety of remedial measures are available to reduce formaldehyde levels. Cost and effectiveness of these measures vary.

Finally, formaldehyde is but one of many volatile organic compounds that must be assessed to determine impacts on indoor air quality. 8 references, 1 figure, 3 tables.

31652 **(FMI-RR—84) Study of sulphur and suspendings in the air in the town Lahti (Finland).** Kartastenpaeae, R.; Haekkinen, A.J.; Jokinen, J. (Finnish Meteorological Inst., Helsinki). 1981. 54p. (In Finnish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84751459.

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The aim of the study is to investigate the air quality in the town Lahti: the occurence of sulfur dioxide and suspended dust in the city air, the diffusion of sulfur dioxide and its effects on coniferous trees. Information about discharge of SO_2 and its seasonal fluctuations are available. Measurements of SO_2 and suspended dust have been made during 1977-79. Effects on needles of pines have been studied by damage and sulfur research. Diffusion of SO_2 has been measured bimonthly V/-78-VIII/1979. Total discharge was 6500 t/a. In wintertime discharges were double with regard to summer. Contents of long duration varied between 29-42 $\mu g/m^3$. The highest twenty-four hours content was 331 $\mu g/m^3$ and the highest content of short duration 725 $\mu g/m^3$.

31653 **(LBL—17782) Studies in atmospheric chemistry. I. Primary peroxides from hydrocarbons. II. Elemental analysis using nuclear reactions.** McKinney, P.M. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 77p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012246.

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The interaction of combustion effluents with SO_2 was studied in a cylindrical reactor. The apparent SO_2 concentration was reduced by 60 to 90% durng propane combustion but only 10% during CO, natural gas or hydrogen combustion. Peroxides were collected in a bubbler from the combustion effluent of methane, ethane, propane and butane. The peroxide concentration was greatest when the flame was interrupted. These peroxides reacted rapidly with HSO_3^- forming SO_4^{2-}. 41 references, 16 figures, 8 tables.

31654 **(MST-LUFT-A—77) EMEP bulletin 1981.** Heidam, N.Z. (Miljoestyrelsen, Roskilde (Denmark). Luftforureningslab.). Jun 1983. 51p. (In Danish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84751454.

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Survey of air pollution in the rural regions of Denmark is given for 1981. The diagrams based on results registered by the Danish EMEP stations give concentrations of air-polluting substances in air and precipitation as well as ground deposition presented for monthly periods and for the whole year.

31655 **(PB—84-146919) Health hazard evaluation determination report No. MHETA-82-118-9005, Amax coal company, Gillette, Wyoming.** Gunter, B.J.; Reno, S.J. (National Inst. for Occupational Safety and Health, Morgantown, WV (USA)). Nov 1982. 10p. NTIS, PC A02/MF A01.

Worker exposures to an organic hydrocarbon cleaner, Electrosol (8027541) was examined at the Amax Coal Company's Belle Ayr Mine (SIC-1211), Gillette, Wyoming. The study was requested by an employee and was conducted on June 15 and 16, 1982. Two breathing zone and three general area air samples were collected for methyl-chloroform (71556) which was being used to clean earthmoving equipment. The authors conclude that environmental sampling did not indicate an overexposure to airborne concentrations of methyl-chloroform. Due to the possibility of workers receiving high exposures during cleaning, it is recommended that protective clothing and respirators with organic vapor cartridges be employed.

31656 **(PB—84-146943) Walk-through survey report: control technology for asbestos removal contractor at Duall, Inc., Mt. Laurel, New Jersey.** Hollett, B.A. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). May 1983. 14p. NTIS, PC A02/MF A01.

High velocity low volume technology (HVLV) in the asbestos (1332214) removal industry was investigated at the Duall Company (SIC-1795), Mt. Laurel, New Jersey, on March 22, 1983. Work processes involved covering all interior surfaces containing asbestos, constructing a controlled area entrance with a double passage to act as an air lock, and the use of high volume ultra high efficiency filtration units to maintain negative air pressure in the controlled area to reduce airborne fiber count. Work practices were essential in minimizing asbestos exposure. The authors conclude that the Duall asbestos removal activities are remarkably well controlled; however, there are no applications of HVLV systems because the volume of material removed and the larger pieces of debris are not amenable to vacuum removal.

31657 **(PB—84-148113) Occupational health control technology for the primary aluminum industry. Technical report.** Sheehy, J.W. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Physical Sciences and Engineering). Jun 1983. 62p. NTIS, PC A04/MF A01.

The results of a survey of 12 United States and 2 Japanese primary aluminum (7429905) facilities (SIC-3334) were examined. The U.S. facilities include seven centerwork and two sidework prebake units, and two horizontal and one vertical Soderberg facility. The Japanese sites included one vertical stud Soderberg and one centerwork prebake facility. The control technology currently used for prebake and Soderberg primary aluminum smelting facilities were described, focusing on effective control technologies found in ore handling and storage, green carbon unit, carbon bake unit, anode rodding, and potlines. Specific chemical agents included fluorides in the potrooms, hydrocarbon vapors in the green carbon facility, sulfur-dioxide (7446095), and hydrocarbons in the carbon bake unit, airborne particulates in ore handling, and metal dust and fumes in the rodding room. All sites provided formal health and safety programs, and personal protective equipment. Personal and area air samples revealed that total fluoride (16984488) concentrations were controlled below 2.5 milligrams per cubic meter (mg/cu m), but concentrations of coal-tar (8007452) pitch volatiles commonly exceeded 0.20 mg/cu m. The authors conclude that the use of solid pitch may reduce exposure to pitch volatiles. The cleaning of conveyor belts for hot pitch anode mix should reduce hydrocarbon fume generation.

31658 **(PB—84-148386) Health hazard evaluation determination report No. MHETA-80-119-9007, Peabody Coal Company, Ken Surface Mine Processing Plant, Beaver Dam, Kentucky.** Hewett, P. (National Inst. for Occupational Safety and Health, Morgantown, WV (USA)). Nov 1980. 29p. NTIS, PC A03/MF A01.

Possible adverse health effects caused by welding in coal washboxes at the Peabody Coal Company (SIC-1211) near Beaver Dam, Kentucky, were evaluated. The request was made by the United Mine Workers of America following an incident involving a worker suffering a stroke after welding in a coal washbox. The industrial hygiene survey was conducted on January 24, 1982. A total of eight welders were potentially exposed in the coal washboxes. Exposure to total welding fume, iron-oxide (1309371) fume, manganese (7439965) fume, fluorides, ozone (10028156), carbon-monoxide (630080), and nitrogen-dioxide (10102440) were monitored. The American Conference of Governmental Industrial Hygienists (ACGIH) exposure limits for these substances are 5 milligrams per cubic meter (mg/m3), 5mg/m3, 1mg/m3, 2.5mg/m3, 0.1 parts per million (ppm), 50ppm, and 3ppm, respectively. All exposures were less than the ACGIH limits or the NIOSH recommended health standard. The authors conclude that the work practices and ventilation control measures are effective in controlling welder exposure to welding fumes and gases. It is suggested that these procedures continue as company policy when welding maintenance is required inside the washboxes.

31659 **(PB—84-148501) Health hazard evaluation determination report No. MHETA 81-108-9004.** Cornwell, R.J. (National Inst. for Occupational Safety and Health, Morgantown, WV (USA)). Nov 1982. 23p. NTIS, PC A02/MF A01.

Employee exposure to diesel emissions at the Climax Molybdenum Company Mine (SIC-1061) in Climax, Colorado was investigated. The study was requested by the Oil, Chemical, Atomic

Workers Union and was performed on September 23 and 24, 1981. The mine employed about 1200 people in underground operations. Environmental air samples were taken for nitrogen-dioxide (10102440), sulfur-dioxide (7446095), polynuclear aromatic compounds, formaldehyde (50000) respirable particulates and free silica (14808607), carbon-monoxide (630080), and carbon-dioxide (124389). Seventy four percent of the environmental samples collected for diesel particulates contained an average of 0.3 percent polynuclear aromatic compounds by weight as the cyclohexane soluble fraction. Thirty six percent of the free silica samples equaled or exceeded the NIOSH recommended limit of 0.05 milligrams per cubic meter. An average of 0.26 parts per million of nitrogen-dioxide was present, although long term exposures may have exceeded the NIOSH recommended limit of 1 part per million. The remaining substances were either not detected or were well below the recommended criteria. The authors conclude that the potential for a health hazard exists from exposure to free silica and polynuclear compounds.

31660 **(PB—84-155845) Sampling and analysis methods for hazardous waste combustion. Final report.** Harris, J.C.; Larsen, D.J.; Rechsteiner, C.E.; Thrun, K.E. (Little (Arthur D.), Inc., Cambridge, MA (USA)). Feb 1984. 441p. NTIS, PC A19/MF A01.

The report is a reference document, describing sampling and analysis methods for measuring the hazardous constituents (as defined in 40 C.F.R., Part 261, Appendix VIII) which might be designated as principal organic hazardous constituents (POHCs) in the various influent and effluent streams of incineration facilities. The methods for these constituents are described in the text. Also included is a concise summary sheet for each recommended method which states the name and number of the method, the types of samples and specific analytes to which the method applies, a brief description of the method, instrument, and operating conditions, and reference(s) to more detailed descriptions of the procedure. Technician-level protocols are thus incorporated by reference, rather than by reproduction in this report. In addition to presenting the methods for sampling and analysis of POHCs at these facilities, information concerning additional sampling and analysis requirements, general strategies for preparing sampling and analysis plans to meet the regulatory requirements, and guidelines for reporting and documentation are discussed.

31661 **(PNL—4869) Overview of the oxidation and scavenging characteristics of April rains (OSCAR) experiment.** Easter, R.C.; Dana, M.T.; Thorp, J.M.; Busness, K.M.; Hales, J.M.; Raynor, G.S.; Benkovitz, C.M.; Tanner, R.L.; Shannon, J.D. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76RL01830. 96p. NTIS, PC A05/MF A01; GPO Dep. Order Number DE84012998.

The OSCAR (Oxidation and Scavenging Characteristics of April Rains) field experiment was conducted in April, 1981, as part of the MAP3S/RAINE program. The OSCAR study was designed to provide detailed characterizations of the physicochemical and dynamical features of selected cyclonic storm systems as they traversed the eastern U.S. Major experiment components included sequential precipitation chemistry measurements, aircraft measurements both in cloud and in clear air in storm inflow regions, surface-level air chemistry measurements, and supporting meteorological measurements. The precipitation chemisty network consisted of an intermediate-density network with 37 sampling sites covering the region from southern Ontario to Tennessee and from Illinois to New Hampshire, and a high-density network with 47 sampling sites located in a 100 by 100 km area in northeast Indiana. A total of four storm events were studied during the experiment. The report describes the design and operational aspects for the high-density and intermediate-density components of the experiment, and the composition of the integrated OSCAR data set which has been developed. A synoptic meteorological description of the four storm events studied during OSCAR is also provided. 17 references, 13 figures, 8 tables.

31662 **(UCID—20063) Eagle series data report: 1983 nitrogen tetroxide spills.** McRae, T.G.; Cederwall, R.T.; Goldwire, H.C. Jr.; Hipple, D.L.; Johnson, G.W.; Koopman, R.P.; McClure, J.W.; Morris, L.K. (Lawrence Livermore National Lab., CA (USA)). Jun 1984. Contract W-7405-ENG-48. 140p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012314.

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A series of six N_2O_4 spills (Eagle series) was conducted at the Frenchman Flat area of the DOE Nevada Test Site in 1983. Four of the tests (EAG1-EAG3, EAG6) were for the purpose of studying the source strength characteristics and heavy gas dispersion aspects of N_2O_4 spills on the ground. Two of the tests (EAG4, EAG5) were for the purpose of evaluation of a portable foam vapor suppression system. The tests were performed between September 8, 1983 and October 30, 1983 and involved a total of 16 m^3 (4200 gal) of N_2O_4. This data report describes the spill facility and its operation, and all of the diagnostic instrumentation used by LLNL during these tests. All of the meteorological data necessary to adequately describe the local atmospheric conditions during each test are presented. Data pertaining to the source strength and downwind dispersion of N_2O_4 vapor are also presented, with particular emphasis on the EAG1, EAG3, and EAG6 spills. 11 references, 86 figures, 3 tables.

31663 (UCRL—50025-84-1, pp 19-24) **LGF data acquisition system.** Johnson, G.W. Apr 1984. NTIS, PC A03/MF A01. Order Number TI84011526.

In Electronics Engineering Department EE technical review.

The Liquefied Gaseous Fuels Data Acquisition System (LGFDAS) was developed in 1980 to acquire data during LNG dispersion tests at the Naval Weapons Center at China Lake, California. The system was deployed there for two major test series during 1980 (Burro series) and 1981 (Coyote series). This past year (1983), the system was modified slightly and deployed at the Department of Energy's Nevada Test Site (NTS) to measure the dispersion properties of anhydrous ammonia (NH_3) and nitrogen tetroxide (N_2O_4). These two toxic materials are widely transported, and thus subject to accidental spillage, so it is important to understand their dispersion properties. The LGFDAS possesses unique capabilities to make measurements for the determination of these properties.

31664 **(UCRL—89687) Evaporation and gaseous dispersion of large-scale releases of nitrogen tetroxide.** McRae, T.G.; Goldwire, H.C. Jr.; Koopman, R.P. (Lawrence Livermore National Lab., CA (USA)). 6 May 1984. Contract W-7405-ENG-48. 22p. (CONF-8405183—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012267.

From Joint Army Navy Nasa Air Force S and EPS annual meeting; Las Cruces, NM, USA (7 May 1984).

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A series of large-scale spills (3 to 5 m^3) of nitrogen tetroxide (N_2O_4) was performed at the Nevada Test Site (NTS) for the Air Force Engineering and Services Laboratory, Environics Division. The purpose of these experiments was to study the evaporation rates and heavy gas dispersion aspects of realistic size releases of N_2O_4, a rocket fuel oxidizer for the Titan II missile system. The Titan II complexes are currently being decommissioned, resulting in an increase in the overland transportation of this toxic material. The normal boiling point for the liquid N_2O_4 is 21°C, hence it evaporates rapidly when spilled onto warm soil and quickly dissociates into nitrogen dioxide (NO_2) as it mixes with air. The NO_2 is highly toxic with an ACGIH threshold limit value 3 parts per million (ppM). The design of the spill facility and the diagnostics are described. Some typical results for one of the spills are presented. The data include the atmospheric boundary layer conditions in effect during the spill, the spill area heat flux and vapor temperature, the vapor flux measured at 25 meters (m) downwind, and the NO_2 gas concentration contours at 785 m. A comparison of the measured NO_2 concentration and that calculated with the Air Force Ocean Breeze/Dry Gulch (OB/DG) model is discussed. 10 references, 8 figures, 2 tables.

31665 (VTT-TUTK—231) Emission inventory of coal, peat and oil-fired power plants. Pohjola, V.; Hahkala, M.; Haesaenen, E. (Valtion Teknillinen Tutkimuskeskus, Espoo (Finland)). Oct 1983. 262p. (In Finnish). Valtion Teknillinen Tutkimuskeskus, Espoo, Finland. Order Number TI84751467.

Measurements were carried out of the emissions of SO_2, NOsub(x) fly ash, heavy metals and radioactive elements from eight power plants and district heating plants burning coal, peat or heavy fuel oil. In addition, PAH-emissions were measured in the case of one coal-fired and three peat-fired plants, and the following emissions were also measured from one peat-fired plant: total hydrocarbons, aldehydes, benzene, toluene, xylene as well as the metals lead, cadmium and mercury in the gaseous phase. The mutagenicity of the stack gases was investigated using stack gas samples from one coal-fired, one oil-fired and three peat-fired plants. Samples were taken from the fuel and from both bottom ash and fly ash for elemental analysis. Elemental concentrations of imported coal and fuel oil as well as of the peat fuel were monitored over an extended period of time. The results obtained indicated that the SO_2 emissions per unit of fuel energy in the case of oil were 2-3 times greater than the corresponding emissions from coal and as much as 6-9 times greater than from peat. Emissions of nitrogen oxides from the burning of coal were on average double those from peat and threefold in comparison with the corresponding emissions from oil. Charactericitic fly ash emission from the combustion of coal was about three times greater than from peat burning. Fly ash emissions from the burning of fuel oil were about half those from coal when the fly ash collection efficiency in conjunction with coal burning was 99%. Characteristic emissions of heavy metals were greatest in the combustion of coal, with the expection of vanadium and nickel of which the greatest emissions were from oil. PAH-emissions were similar in the combustion of both coal and peat. Slight mutagenicity of the stack gases from coal- and peat-fired power plants was demonstrated.

31666 Similarity of some organic compounds in spark-ignition and diesel engine particulate extracts. Behymer, T.D.; Hites, R.A. (Indiana Univ., Bloomington). *Environmental Science and Technology;* **18**: No. 3, 203-206(Mar 1984).

The abudance and distribution of selected polycyclic aromatic hydrocarbons (PAH) and oxy-PAH as well as the alkyl homologues of each, produced by automobiles equipped with diesel and spark-ignition engines were compared. These different engine types produced PAH and oxy-PAH mixtures which were qualitatively and quantitatively similar; thus, it will be difficult to differentiate diesel emissions from those produced by spark-ignition engines once they enter the environment. 24 references.

31667 Identification of VO_2i in particles from the flue lines of oil-fired power plants. Eatough, D.J.; Eatough, N.L.; Hill, M.W.; Mangelson, N.F.; Hansen, L.D. (Brigham Young Univ., Provo, UT). *Environmental Science and Technology;* **18**: No. 2, 124-126(Feb 1984). Contract AC02-80EV10405.

Fly ash samples were collected from the flue lines of two different oil-fired power plants and analyzed by a variety of analytical procedures designed to determine the V cations extractable from the samples. Both VO_2^+ and VO^{2+} were shown to be present in the samples. The V(V) cation, VO_2^+, was the principal species extracted from these samples.

31668 Regional, new source bubble policy: its advantages illustrated for the State of Illinois. Streets, D.G.; Garvey, D.B.; Grogan, P.J.; Hanson, D.A.; Carter, L.D. (Argonne National Lab., IL). *Journal of the Air Pollution Control Association;* **34**: No. 1, 25-31(Jan 1984).

The purpose of this paper is to illustrate for members of the regulatory and policy community the advantages to be gained from two changes to the U.S. Environmental Protection Agency's bubble policy: allowing statewide bubbling of SO_2 sources and allowing sources regulated under the new source performance standards to be bubbled with sources regulated under state implementation plans for attaining the National Ambient Air Quality Standards. Illinois was selected as a test state because of the wide range of emission limits applicable to utilities in that state. This preliminary analysis indicates that implementation of these two changes could save Illinois utilities about half what they now spend to reduce SO_2 emissions under current regulations, without any increase in SO_2 emissions. The saving would amount to about $300 million per year. The use of low-sulfur coal would increase, causing some adverse impacts on the local high-sulfur coal mining industry; however, an auxiliary analysis indicates that the use of local low- to medium-sulfur coal could alleviate these adverse impacts on Illinois miners and reduce the cost of emission control even further, with no increase in emission. Local ambient air quality would, on balance, be expected to improve under this new policy.

31669 Continuous measurements of radon entry in a single family house. Grimsrud, D.T.; Nazaroff, W.W.; Nero, A.V.; Revzan, K.L. (Lawrence Berkeley Laboratory Berkeley, California). *Proceedings, Annual Meeting, Air Pollution Control Association;* **83-9.8**: 22(Jun 1983). (CONF-830617—).

From 76. annual meeting of the Air Pollution Control Association; Atlanta, GA, USA (19 Jun 1983).

The body of information in this paper is directed to researchers and others interested in the field of indoor air quality. It is a progress report that describes detailed measurements during a six-month period of radon concentration, ventilation rate, and other environmental parameters that affect radon entry in a single-family house. Average radon concentrations in the house varied between 0.1 and 18.4 pCi/l during this period; the mean value observed was 3.1 pCi/l. Ventilation rates ranged from 0.03 to 1.00 ach; the mean value was 0.25 ach. The data show that the radon source strength varied substantially during the measurements; we continue to examine the environmental parameters measured to obtain a better understanding of the processes that influence radon entry into the house. The major radon entry site in this structure appears to be the basement sump. A portion of the time variation the entry rate can be associated with changes in the water level in the sump that couples and decouples the sump with an exterior drain tile system.

31670 SO_2 (G) to sulfate conversion rate in an oil-fired power plant plume in a fog bank. Eatough, D.J.; Arthur, R.J.; Cooper, J.A.; Eatough, N.J.; Hansen, L.D.; Hill, M.W.; Mangelson, N.F.; Richter, B.E. (Brigham Young University Provo, Utah). *Proceedings, Annual Meeting, Air Pollution Control Association;* **83-31.1**: 17(Jun 1983). (CONF-830617—). Contract AC02-80EV10405.

From 76. annual meeting of the Air Pollution Control Association; Atlanta, GA, USA (19 Jun 1983).

High acidity in rain fall cloud droplets and fog droplets in areas influenced by anthropogenic sources of SO_2 (g) and NO / SUB x/ (g) has been attributed to the formation of both H_2SO_4 and HNO_3. It has been suggested based on the analysis of field data, that rapid conversion of SO_2(g) to sulfate must occure in cloud or fog droplets. Data on the conversion of SO_2(g) to sulfate in water droplets is largely confined to the results of laboratory studies. Hegg and Hobbs have reported on the production of sulfate in wave clouds based on the measurement of particulate matter sulfate concentrations before and after passage of an air mass through the cloud. Because of major uncertainties in the measurement of the residence (and hence reaction) time of the air mass in the cloud, their results have large uncertainties. However, the oxidation rate in the more acidic clouds (pH of cloud droplets<5) was 20 + or - 33% SO_2(g) hr^{-1}

31671 Sampling of stack gas for sulfur dioxide with a molecular sieve adsorbent. Chriswell, C.D.; Gjerde, D.T. (Ames Lab., IA). *Analytical Chemistry;* **54**: No. 11, 1911-1913 (Sep 1982). Contract W-7405-ENG-82.

A more convenient absorber for SO_2 than the usual liquid-filled impinger trains is a molecular sieve absorbent. A small, pencil-sized absorption column is described herein. SO_2 is quantitatively adsorbed, and major components of stack gases such as nitrogen, oxygen, CO_2, and water vapor do not interfere with the collection of SO_2. The adsorption column technique could be coupled with thermal decomposition and gas chromatography to determine the composition of gaseous effluents. Data are presented for adsorption on silicate molecular sieves.

31672 **Microbiologic content of aerosols generated in the classification shed of a Municipal Solid Waste (MSW) Processing Facility, Pompano Beach, Florida.** Streitfeld, M.M.; Roth, F.J. Jr.; Chester, B.; Voorhees, S.A.; Daly, E.L. Jr.; Samowitz, J.; Narasimhan, R.; Sengupta, S.; Wong, K.V.; Gerrish, H.P. (Univ. of Miami, Coral Gables, FL). pp 97-108 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Studies were carried out at the REfCOM facility at Pompano Beach, Florida, to quantify and identify the bacterial and mycotic content of aerosols resulting from the front end MSW shredding technology. Ambient air samples collected within the Classification Building, and an air classified light fraction of the MSW, were found to contain large numbers of Pseudomonas aeruginosa, Staphylococcus aureus, Salmonellae and coliform bacteria, as well as Serratiae and enterococci. Candida krusei, Candida tropicalis and Geotrichum candidum were the most common (87 percent of 6001 fungal isolates) of the mycotic taxa identifed from eight ambient air samples collected. 20 references, 3 figures, 4 tables.

31673 **Electrostatic precipitator for the control of HC1 and particulate emissions from a municipal incinerator.** Brabham, E.; Tarapore, P. (United McGill Corp., Columbus, OH). pp 457-464 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The application of a pilot-scale, needle-plate electrostatic precipitator to control particulate emissions from a municipal incinerator is reported. The primary factor which influenced the particulate collection was the energized collection surface area of the electrostatic precipitator. Other factors considered in the testing program were the flow through velocity in the precipitator and the moisture content and temperature of the gases. Gaseous pretreatment with dry hydrated lime was found to be effective in lowering the concentration of HCl in the emissions by up to 95%.

5003 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 30358

31674 **(DE—83048527) HERMES; regional radiological effects analysis. Software.** Bentley, B.W.; Black, W.E.; Dotson, W.L.; Fletcher, J.F.; Haffner, D.R. (Hanford Engineering Development Lab., Richland, WA (USA)). 1984. mag tapep. (ANL/NESC—527). NTIS (US Sales Only); Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

The HERMES model calculates the regional radionuclide releases and radiation dose to the populace in a given year arising from the operation of nuclear facilities to meet electrical generation demands within a given study region. The following are all approximate dimension restrictions - 12 time-periods (months) 50 radionuclides 200 radionuclide sources (nuclear sites) 300 receptor locations. (ERA citation 08:020663)...Software Description: UNIVAC1108; FORTRAN IV and SLEUTH; CSCX; 65K memory and a magnetic drum or alternative device for storage of large amounts of data.

31675 (INIS-mf—8962, pp K1) **Determination of plutonium and uranium isotopic ratios in air for environmental monitoring.** Sorantin, H. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31676 **(PNL-SA—11792) Transuranic resuspension.** Sehmel, G.A. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76RL01830. 38p. (CONF-8311110—4). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011903.

From 6. workshop on environmental research for actinide elements; Hilton Head Island, SC, USA (7 Nov 1983).

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Characteristics of aged resuspension sources are more uncertain than those of new resuspension sources, which can be investigated using inert-particle controlled-tracer sources. Even though airborne concentrations are low, one aged uniform-area source which can be used for resuspension studies is the accumulated radionuclide fallout in the soil from stratospheric and tropospheric fallout debris. Airborne radionuclide concentrations from this source were investigated at convenient locations on the Hanford site. The objective is to summarize plutonium and americium resuspension research conducted by the Pacific Northwest Laboratory from 1977 to 1983. Airborne plutonium was determined at five sites in the Hanford area, and both plutonium and americium were determined at two Hanford sites. Airborne plutonium and americium were examined as a function of aerodynamic particle diameter, sampling height, wind speed increments, and wind direction increments. The following results are discussed: airborne radionuclide concentrations, $\mu Ci/cm^3$ of sampled air; radionuclide activity densities, $\mu Ci/g$ of airborne solids; airborne plutonium fluxes, $\mu Ci/(m^2\ day)$; $^{241}Am/^{239+240}Pu$ activity ratios, $(\mu Ci\ ^{241}Am)/(\mu Ci^{239+240}Pu)$; and airborne solid concentrations, $\mu g/m^3$ of sampled air. In addition, a relationship based on field data for aged plutonium sources at Bikini Atoll, the Hanford site, and Rocky Flats was developed to estimate the maximum expected plutonium activity density on airborne solids compared to activity densities for bulk surface-soil samples. As a result, it is possible to more accurately predict resuspension factor ranges as a function of the resuspension source activity densities. 31 references, 18 figures, 5 tables.

5004 Thermal Effluents Monitoring And Transport

31677 **(EPRI-CS—3403-CCM) User's manual: cooling-tower-plume prediction code.** Policastro, A.J.; Coke, L.; Wastag, M. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 218p. NTIS, PC A10/MF A01; 1 - EPRI; GPO Dep. Order Number DE84012053.

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This report presents the theory and user's guide to a mathematical model for the prediction of the seasonal/annual physical impacts of cooling tower plumes, drift, fogging, icing, and shadowing. The model is aimed at providing predictions that may be used in the licensing of power plants with cooling towers. The submodels for these physical impacts provide improvements in theory and performance compared to existing methods. Validation with field and laboratory data has been done in all situations where good quality data exist. The seasonal/annual methodology employs a new technique which reduces the available meteorological record at a site to approximately 30 to 100 categories. The plume submodels are then run once for a representative of each category and results are summed up to provide predictions for a season or the year. The model allows the treatment of any number of identical natural- or mechanical-draft cooling towers in any geometrical orientation. The model is easy to use and requires a minimal amount of user input. It is set up to run with a TDF-14 or CD-144 ground level meteorological tape or standard NRC meteorological tape. The model encompasses four computer codes in which the output of one is the input to the next. In this way, intermediate output that may be informative is saved and may be examined. The use of a sequence of four codes permits more flexibility to the user allowing him the opportunity to better define the type and scale of printed output he wishes. The model is applied in two case studies, one for a site with three nearly colinear natural-draft cooling towers, and the other for a site with two linear mechanical-draft cooling towers oriented parallel to each other. Input and output to the codes are presented and described.

5006 Regulations

REFER ALSO TO CITATION(S) 31726

31678 **(PB—84-145895) Global energy futures and CO_2-induced climate change. Chapters 1-8.** Rose, D.J.; Miller, M.M.; Agnew, C. (Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.). Nov 1983. 238p. (MIT-EL—83-015). NTIS, PC A11/MF A01.

See also PB84-145903.

Energy options relevant to lessening the buildup of carbon dioxide (CO_2) in the atmosphere in future years, thereby ameliorating the predicted consequent climatological effects, are discussed. The question of energy modeling for an uncertain future is addressed, and methods and long-term energy scenarios are examined, with a focus on highly aggregated global energy-economic models. A set of scenarios is developed, incorporating a range of future energy costs, resource availabilities (including cutoffs and moratoria), and end-use efficiencies. New energy options which are substantially electric are considered, including nuclear, wind, and solar photovoltaic power. The status of electric system integration is explored and the incorporation of energy storage and non-dispatchable sources is analyzed. The question of how to discount the future is raised, and it is pointed out that discounting is useful for comparing options but not for judging present cost/benefit of far future events. Because of the global character of energy CO2 consequences, it is noted that any responses to the problems must be international in scope.

31679 **(PB—84-145903) Global energy futures and CO_2-induced climate change: appendices.** Rose, D.J.; Miller, M.M.; Agnew, C. (Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.). 1983. 105p. NTIS, PC A06/MF A01.

See also PB84-145911; PB84-145895.

This document consists of six appendices. A list of inputs to the Institute for Energy Analysis Energy Model (the Edmonds-Reilly model), is provided. Parameters include resource constrained technologies, energy service input/output coefficients for oil, gas, coal, and electricity, and renewable resource constrained technologies. Inputs to eleven energy scenarios are presented and global primary energy consumptions in the scenarios are given, along with specified carbon emissions for selected cases. Material requirements for energy technologies and for the scenarios are supplied. The text of the Uniform Transboundary Pollution Reciprocal Access Act is included.

31680 **(PB—84-145911) Global energy futures and CO_2-induced climate change: executive summary.** Rose, D.J.; Miller, M.M.; Agnew, C. (Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.). 1983. 18p. (MIT-EL—83-015-ES). NTIS, PC A02/MF A01.

See also PB84-145903.

Energy options relevant to improving the buildup of carbon dioxide (CO2) in the atmosphere, thereby ameliorating the consequent climatological effects, are discussed. it is noted that, on the basis of current understanding of the effect of CO2 on climate and trends in global energy use, a significant CO2 warming in the next century cannot be avoided. However, via the adoption of alternative forms of energy, the rate of increase of atmospheric CO2 due to fossil fuel consumption can be significantly reduced. It is suggested that, with the trend toward a more electric world, electric systems should be thoroughly investigated. More thought should be given to nuclear power, which costs significantly less than coal power. The use of wind power in selected regions is suggested, and the need to reduce energy consumption is emphasized. Because the consequences of CO2 usage are global ones, the need for an international response to the problem is cited.

31681 **(PB—84-148295) Criteria for a recommended standard: occupational exposure to styrene.** (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Sep 1983. 264p. NTIS, PC A12/MF A01.

The National Institute for Occupational Safety and Health (NIOSH) recommends that worker exposure to styrene in the workplace be controlled by compliance with the following sections. These recommendations are designed to protect the health and provide for the safety of workers for up to a 10-hour workshift, 40-hour workweek, over a working lifetime. Compliance with all sections of the recommended standard should prevent or greatly reduce the risk to exposed workers of adverse effects. NIOSH considers the recommended environmental limits for styrene to be upper boundaries of exposure. Thus, employers should make every effort to maintain exposure concentrations as low as possible. This recommended standard will be subject to review and revision as necessary.

31682 **International cooperation in environmental decision making.** Hill, A.A. (President's Council on Environmental Quality, Washington, DC). *Environmental Professional, The;* 6: No. 1, 3-7(1984).

From Conference of the National Association of Environmental Professionals; Detroit, MI, USA (26 Apr 1983).

The Reagan Administration believes that more scientific data are needed before the US can formulate international policies on such issues of acid rain. The author notes the problems inherent in the need for policy makers to have and understand scientific and technical information and in the potential for data to be generated that is inappropriate for the questions being asked. Reviewing the divisive history of acid rain issues, he raises questions about the definition of acidic precipitation, its depositions, and its influences that need to be answered before the US and Canada can develop satisfactory regulations.

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL

5102 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 31709, 31829

31683 (ANL—82-65-Pt.3, pp 15-19) **Comparison of soil-water and groundwater quality of two reconstructed soil systems exposed to ambient precipitation.** Irving, P.M.; Prepejchal, W.; Mabury, S.; Willman, L. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

A field microcosm facility was constructed to examine the impact of rainfall acidity on two plant/soil systems. The two reconstructed soils are a loam, LaHogue, and a sandy loam, Alvin. Measurements of pH in the soil water compared to that of the incoming precipitation indicate that precipitation acidity is rapidly neutralized as it percolates through the soil column and is closely related to the soil pH. Sulfate concentrations present in the soil water suggest that the Alvin soil has a greater sulfate absorption capacity than the LaHogue. 1 reference, 3 figures, 3 tables.

31684 **(CONF-8405174—1) Laboratory extraction method to simulate co-disposal of solid wastes in municipal waste landfills.** Francis, C.W.; Maskarinec, M.P.; Goyert, J.C. (Oak Ridge National Lab., TN (USA); Science Applications, Inc., Oak Ridge, TN (USA)). 1984. Contract AC05-84OR21400. 37p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012335.

From 4. symposium on hazardous and industrial solid waste testing; Arlington, VA, USA (2 May 1984).

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The objective was to develop a laboratory extraction method for solid wastes that simulates concentrations of inorganic and organic constituents in leachates resulting from co-disposal with municipal wastes in landfills. A scientific rationale and a data base are presented supporting the use of such an extraction method to characterize the potential hazards of leachates from a solid waste co-disposed with municipal waste in a landfill containing about 95:5 ratio of municipal and industrial waste, respectively. Two field lysimeters, each containing approximately 1.5 Mg of assorted municipal wastes, were used to generate a municipal waste leachate (MWL) that in turn was used to leach four industrial wastes under anoxic simulated co-disposal conditions. Leachates from the four industrial wastes were monitored for concentrations of inorganic and organic

constituents, several laboratory extraction methods that might be used to simulate the target concentrations were evaluated. 8 references, 3 figures, 5 tables.

31685 **(GSF-OE—721) Methods for pre-assessing the chemical-pollutant load of Bavaria's population (period: 10-20 years).** Suemmermann, W.; Korte, F. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.)). 1983. 93p. (In German). 110M Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Attaching, Germany, F.R.. Order Number TI84751257.

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Basically, there are two different methodical approaches available for an assessment of the population's load of chemical pollutant: 1) Comprehensive monitoring by analyses of environmental and human samples as complete as possible, 2) assessment of occuring concentrations based on production statistics and application areas. After it has been realized that comprehensive analytical monitoring of chemical concentration hardly represents a feasible approach to an assessment of the risk involved in each case, the study on hand was intended to try and develop methods allowing this assessment of the chemicals concerned by means of production and market data. When working on the study, a restriction to a small number of guide or model substances and an emphasis on the area of emission appeared to serve the purpose without taking into account, at first, to which concentrations in the different environment media this emission will lead. The guide substance were selected from substantial substance lists according to the criteria of production amount, toxicity, ecotoxicity, direct application, persistency and biological accumulativity. They comprise the chlorinated solvents trichlorethylene and perchlorethylene, the fungicide pentachlorophenol and the plasticizer dioctylphthalate.

31686 **(PB—84-152966) Health hazard evaluation report No. HETA 82-056-1186, Monroe County Incinerator, Key Largo, Florida.** Williams, T.; Hickey, J.L.S. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Sep 1982. 14p. NTIS, PC A02/MF A01.

On November 24, 1981, NIOSH received a request concerned with possible biohazards from the handling of hospital waste (human body parts, blood-contaminated bedding and wearing apparel, syringes, and operating room waste) at the incinerator. Interviews with several incinerator operators and general laborers did not reveal any incident of human body parts being seen or spilled from bags. Blood had been observed leaking from bags onto truckbeds and the incinerator floor. The State Epidemiologist was contacted and found to be aware of the concern for worker exposure to infectious waste as it was being handled by personnel outside hospitals and health care units. The 1982 Florida Legislature adopted a bill providing regulation of infectious waste disposal. The act requires that each hospital and ambulatory surgical center properly identify, segregate, and separate infectious from solid waste, and that any transporter of infectious waste be notified of the existence and location of such waste. No immediate biohazard at the incinerator was identified during the survey; however, worker exposure to infectious wastes due to breakage of the bags because of mishandling is possible. There was no indication of unburned infectious wastes in the grate ash. The bill enacted by the 1982 Florida Legislature should be strictly observed by persons delivering wastes, and incinerator managers should reject any waste not properly bagged and marked.

31687 **Effect of sewage sludge on the adsorption of polychlorinated biphenyls by three New Mexico soils.** Fairbanks, B.C.; O'Conner, G.A. (New Mexico State Univ., Las Cruces). *Journal of Environmental Quality;* **13**: No. 2, 297-300(1984). Contract AS04-76ET33626.

The adsorption of polychlorinated biphenyls (PCB's) (54% Cl) by three low-organic matter New Mexico soils amended with sewage sludge was determined by batch equilibration. Adsorption isotherm data were described by the Freundilich equation. An increase in adsorption with increased organic C content was observed. However, for a given organic C content, adsorption in soils preconditioned with sewage sludge differed from soils amended with sludge at the time of adsorption analysis. Adsorption was greater in a clay soil than in two sandy loams. Differences in organic C content described 56.5% of the variance in the Freundlich K constants for PCB retention across all treatments. Incorporating the factor of clay content or specific surface area into the regression analysis accounted for 79.1% of the variance in K. Freundlich constants normalized for organic C content (K/sub oc/) were not cosntant across treatments.

31688 **Study about the behaviour of inorganic and organic pollutants in aerobic and anaerobic model landfills.** Schneider, W.; Rump, H.H. pp 135-144 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

Water and substance conversion of sanitary landfills and their effects particularly on groundwaters, have been investigated. Some results of this research project are presented. Investigations were carried out in large scale lysimeters containing about 100 tons of wastes each and differing in their characteristics. Since a period of 5 years the leachates and the composition of gases within the lysimeters have been investigated. The solid wastes and the sewage sludge incorporated were comparingly studied at the beginning and 5 years after. The purpose of these investigations was to gain an insight into the chemical, physicochemical and biological processes occuring in a sanitary landfill. Furthermore, toxic chemicals were added into the lysimeters and the effects on the leachate were studied. 5 references, 6 figures, 1 table.

31689 **Partitioning of inorganic exchangeable ammonium-nitrogen in some soil-solution systems.** Naik, V.K.; Wong, K.V.; Sengupta, S.; Voorhees, S.; Nemerow, N.L.; Gerrish, H.P. (Univ. of Miami, Coral Gables, FL). pp 145-158 of Resource recovery from solid wastes. Sengupta, S.; Wong, K.F.V. (eds.). Elmsford, NY; Pergamon Press Inc. (1982). (DOE/EV/10671—1; CONF-820565—). Contract AS05-78EV10133.TI83005317

From Conference on resource recovery from solid wastes; Miami Beach, FL, USA (10 May 1982).

The partitioning of NH_4^+-N, which is defined as the amount of NH_4^+-N removed from the soil-solution by chemical as well as microbial tranformations, in the presence of soil was studied, using three types of soil found in south Florida, namely, the Hallandale fine sand, Plantation muck top layer and the Plantation muck bottom layer. A batch type technique was employed. The concentration of NH_4^+-N in the solution, equilibrated with the soils, ranged from 0.0 to 100.0 mmol NH_4^+-N/L. The pH was maintained below 7.0. The period of time required to reach equilibrium between the soil and solution was determined by separation experiments. All the partitioning studies were carried out under equilibrium conditions. The partitioning observed per unit mass of soil was termed as apparent adsorption. In all three cases an apparent negative adsorption was observed when the equilibrated solution initially contained no NH_4^+-N in it (blank) and the amount of this negative adsorption was found to be proportional to the native inorganic exchangeable NH_4^+-N present in the respective soil. It was concluded that this was mainly due to the chemical desorption of the exchangeably held NH_4^+-N on soil sites. An apparent adsorption was observed over the rest of the concentration range studied, and this was found to increase with the concentration of the equilibrated solution. The apparent adsorption leveled off at high concentrations in all the cases. The Plantation muck top layer, which contained the highest amount of organic matter, showed the highest amount of NH_4^+-N apparently adsorbed for any given equilibrium concentration, amongst the three soils studied. The Hallandale fine sand, containing the least amount of organic matter, showed the least. Significant correlations were observed when the concentration dependent isotherms were fitted with a Langmuir type of isotherm. 34 references, 3 figuress, 2 tables.

5103 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 30321, 30332, 30358, 30358, 30366, 30367, 30368, 30387, 30389, 30863, 31720

31690 **(IAEA-RL—108) Report on intercomparison A-14 of the determination of some mineral components and radionuclides in milk powder.** Pszonicki, L.; Hanna, A.N.; Suschny, O. (International Atomic Energy Agency, Seibersdorf (Austria). Laboratories). Jan 1984. 40p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701845.

To enable those laboratories to control their analytical performance the IAEA's Analytical Quality Control Service organizes periodic international comparisons of the determination of radionuclides or of inorganic components in liquid or in powdered milk. The comparison reported here is one in this series. The analytical results, provided by the laboratories which have participated in the intercomparison, allow the certification of concentration values for three mineral components, viz. calcium, potassium, and sodium and for two radionuclides, viz. cesium-137 and strontium-90, in Milk Powder IAEA/A-14.

31691 **(PB—84-149145) Environmental radiation data report 34, April-June 1983.** (Environmental - Protection Agency, Montgomery, AL (USA). Eastern Environmental Radiation Facility). Sep 1983. 61p. (EPA—520/5-83-028). NTIS, PC A04/MF A01.

See also PB84-104785.

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs. Data from the Environmental Radiation Ambient Monitoring System (ERAMS), and similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD) when available. The ERAMS is comprised of nationwide sampling stations that provide air, surface, and drinking water and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

31692 **(PB—84-149384) Radiological survey of Ingalls Shipbuilding Division, Pascagoula, Mississippi, and environs.** Fowler, T.W.; Windham, S.T.; Callis, R.S.; Phillips, C.R. (Environmental Protection Agency, Montgomery, AL (USA). Eastern Environmental Radiation Facility). Sep 1983. 78p. (EPA—520/5-83-022). NTIS, PC A05/MF A01.

This report presents results of the survey conducted by EERF personnel to assess environmental radioactivity remaining from operations of nuclear-powered vessels at Ingalls Shipyard, Pascagoula, Mississippi. Since Ingalls Shipyard will no longer build or service nuclear powered ships and has completed the decommissioning of the nuclear support facilities, an additional purpose of the survey was to determine if there is any remaining radioactivity from previous operations which could contribute to significant population exposure.

31693 **Field and greenhouse experiments on the fate of technetium in plants and soil.** Garten, C.T. Jr.; Hoffman, F.O.; Bondietti, E.A. (Oak Ridge National Lab., TN). *Health Physics;* 46: No. 3, 647-656(Mar 1984). Contract W-7405-ENG-26.

The behavior of /sup 95m/Tc in plants and in a Captina silt loam soil following a single application of the pertechnetate form of the radionuclide to bare soil was compared between field and greenhouse conditions. Over a period of approx. six months, the net uptake of /sup 95m/Tc by plants from undisturbed, intact soil in the greenhouse was about a factor of 10 greater than that in the field. Sieving the soil through a 2-mm mesh screen before potting and then planting new grass further increased plant uptake of /sup 95m/Tc by approx. a factor of 20 relative to the field. Uptake by new grass was increased even more by decreasing the pot size. Most of the /sup 95m/Tc applied to soil in the field or the greenhouse remained in the top 4 cm of the profile. Soon following application to soil, pertechnetate was transformed, or otherwise immobilized, such that extractions with 0.01 M $CaCl_2$ recovered only a portion of the /sup 95m/Tc present in soil.

5105 Site Resource And Use Studies

31694 **(NVO—281) Land use and withdrawal actions necessary for and in support of the NNWSI project.** Richards, R.H.; Vieth, D.L. (USDOE Nevada Operations Office, Las Vegas). Jun 1984. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84013372.

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The history, status, and plans for land use and withdrawals of Yucca Mountain for the purpose of site characterization, the construction of the Exploratory Shaft (ES), and a high-level nuclear waste repository should the NNWSI Project be selected for one or both projects are discussed. Actions for protecting and acquiring land have been formulated to meet the requirements of 10 CFR 60.121, which states that The geologic repository operations area shall be located in or on lands that are either acquired lands under the jurisdiction and control of DOE or lands permanently withdrawn and reserved for its use. In 1981, when it was perceived that the first repository site would be selected in 1985, the initial plan for acquisition was developed. Because of the schedule slippage that has occurred since the passage of the Nuclear Waste Policy Act (NWPA), that plan is being restructured, but an alternative plan has not been established. 5 figures.

31695 **(PB—84-149558) Construction cost and erosion control effectiveness of filter windrows on fill slopes. Forest Service research note.** Cook, M.J.; King, J.G. (Forest Service, Ogden, UT (USA). Intermountain Forest and Range Experiment Station). Nov 1983. 6p. NTIS, PC A02/MF A01.

Sediment barriers of slash were designed and constructed on the fill slopes of newly constructed roads. These barriers called filter windrows were located in the vicinity of stream crossings in an attempt to prevent eroded fill material from entering the stream. The contractor was able to construct windrows at a rate of 170 ft/h (52 m/h), using a track-mounted Caterpillar 235 hydraulic pull shovel (a large backhoe). The cost of this fill slope treatment was $59 per 100 feet (30 m) of windrowed slope. A conservative estimate of the sediment trapping efficiency of the windrows is 75 to 85 percent, based on measurements of fill slope erosion on windrowed versus non windrowed slopes. The results indicate that the construction of filter windrows on fill slopes is a relatively inexpensive and a very effective treatment for preventing eroded material from entering adjacent streams.

52 ENVIRONMENTAL SCIENCES, AQUATIC

31696 **(ORNL/TM—8919) Corrosion manual for internal corrosion of water distribution systems.** Singley, J.E.; Beaudet, B.A.; Markey, P.H. (Environmental Science and Engineering, Inc., Gainesville, FL (USA)). Apr 1984. Contract AC05-84OR21400. 122p. (EPA—570/9-84-001). NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012856.

Portions are illegible in microfiche products.

Corrosion of distribution piping and of home plumbing and fixtures has been estimated to cost the public water supply industry more than $700 million per year. Two toxic metals that occur in tap water, almost entirely because of corrosion, are lead and cadmium. Three other metals, usually present because of corrosion, cause staining of fixtures, or metallic taste, or both. These are copper (blue stains and metallic taste), iron (red-brown stains and metallic taste), and zinc (metallic taste). Since the Safe Drinking Water Act (P.L. 93-523) makes the supplying utility responsible for the water quality at the customer's tap, it is necessary to prevent these metals from getting into the water on the way to the tap. This manual was written to give the operators of potable water treatment plants and distribution systems an understanding of the causes and control of corrosion.

5201 Basic Studies

31697 **(AD-P—002413/3) Water quality preservation measures in Lake Biwa, the largest lake in Japan.** Shirahase, M. (Shiga Prefecture Water Administration Dept., Otsu (Japan)). 1983. 31p. NTIS, PC A03/MF A01.

This article is from Management of Bottom Sediments Containing Toxic Substances: Proceedings of the US Japan Experts Meeting (7th) held at New York City on 2-4 November 1981, AD-A136740, p. 391-421.

The national government's Basic Law for Environmental Pollution Control provides for desirable environmental quality standards to be maintained to protect the health and living environment of the citizens against air pollution, water contamination, and other environmental disruptions. For the purposes of this law, several area types are provided for application to individual water areas covered. As for Lake Biwa and the Seta River, specific environmental quality standards were made public by the 1972 notification of the Environment Agency, which applied the area types AA(a) and AA(c) to the northern basin and the southern basin, respectively, and the area type A(a) to the Seta River. (For drinking water, AA represents the top rating and A the second rating). In order to help promote the attainment of these standards, a study has been under way since fiscal year 1972 at nine fixed monitoring points specifically designated for this purpose (four in the northern basin, another four in the southern basin, and one in the Seta River). Results of the study on standards for protection the health of the citizens (comprised of nine items relative to toxic substances) were met at each monitoring point. With regard to the conditions of the living environment, it was found that the AA standards on DO (dissolved oxygen) were almost met at each monitoring point, while the standards on COD (chemical oxygen demand) were yet to be attained (Figure 2).

31698 **(BNL—34653) Discussion of the Ionian and Levantine Seas, NATO workshop on atmospheric and oceanic circulation in the Mediterranean basin.** Hopkins, T.S. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 42p. (CONF-8309237—1). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011562.

From NATO workshop on atmospheric and oceanic circulation in the Mediterranean Basin; Santa Teresa, Italy (7 Sep 1983).

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The Levantine Intermediate Water (LIW) is the most critical water mass in the thermohaline heart of the Mediterranean. It is comprised of North Atlantic Water (NAW) which was transformed to salty water (36.2 to 39.2 ppt). In the eastern Mediterranean (EMED) the NAW changes to a warm saline surface layer and a cool less saline layer. Much of the LIW is produced from winter cooling of surface waters. The distribution is patchy, dependant on original surface type, circulation, and atmospheric exposure. Convective depths range to 400 m; the densest water not necessarily correlated with the deepest convective layers. Survival of the LIW depends on circulation and density. The circulation of the EMED is barotropically controlled by sea level. The annual low frequency signal is a trough extending zonally south of center and deepening eastward. The resulting cyclonic circulation is skewed to the south and east. The westerly winds exaggerate the African eastward coastal flow. Wind stress, positive curl in northern Levantine and negative curl in the Gulf of Sirte, contribute to the circulations. Higher frequency variations in water loss impose barotropic noise on the lower-frequency pattern; higher frequency wind energy affects surface circulations and deeper barotropic flows. The internal pressure gradient, resulting from the denser LIW, causes the westward return flow on the northern side within the LIW layer. The deep layers lack potential to drive baroclinic shear; consequently, they react to any unadjusted barotropic pressure gradients. This is substantial even at low frequencies. Deep Water tends to follow the basic barotropic pattern, flowing eastward along the African coast beneath the NAW. 22 references, 11 figures.

31699 **(FWS/OBS—82/32) Ecology of tidal marshes of the Pacific Northwest Coast: a community profile.** Seliskar, D.M.; Gallagher, J.L. (Delaware Univ., Newark (USA). Coll. of Marine Studies). Oct 1983. 75p. NCET-US Fish and Wildlife Service-1010 Gause Blvd., Slidell, LA 70458. Order Number TI84901127.

Tidal marshes of the Pacific Northwest develop (1) on the fringes of estuaries of rivers which empty more or less directly into the ocean or Puget Sound and (2) behind baymouth bars which form between adjacent headlands on the rocky coast. Floristically these wetlands are more complex than marches of equivalent salinity along the gulf, Southeast and Mid-Atlantic coasts. Pacific Northwest marshes resemble more closely those of northern California and parts of New England. Primary productivity ranges widely as do rates of plant decomposition. Detritus appears to fuel a productive food web, the best documented of which involves salmonids feeding in the marsh creeks. Except for insects, macrofauna are not common on the marsh surface. A conceptual model of functional groups within the marsh, and a model depicting interactions between the marshes and adjacent ecosystems are presented. To date fewer quantitative ecological studies have been done on these wetlands than on those in parts of California or the gulf and Atlantic coasts. This situation is rapidly changing and the emerging picture is that Pacific Northwest marshes are similar in function to those more intensively studied. Organisms and relative magnitudes of the fluxes are different, but processes are the same. 84 references, 21 figures, 16 tables.

31700 **(FWS/OBS—83/23) Ecology of San Francisco Bay tidal marshes: a community profile.** Josselyn, M. (San Francisco State Univ., Tiburon, CA (USA). Tiburon Center for Environmental Studies). Oct 1983. 115p. NCET-US Fish and Wildlife Service-1010 Gause Blvd., Slidell, LA 70458. Order Number TI84901129.

San Francisco Bay, the largest estuary on the Pacific coast, historically contained an extensive contiguous system of salt and brackish tidal marshes. Urbanization has decreased tidal marshes by 95% and created a patchwork of remnant tidal marshes highly impacted by human activity. This document compiles available published and unpublished scientific literature to describe the current status and ecology of these remaining marshes. Variation in river inflow (strongly seasonal) and individual species salinity tolerances result in gradual and overlapping distributional ranges. Saline marshes are usually dominated by two halophytes: Pacific cordgrass and pickleweed and brackish marshes by bulrushes: Scirpus spp and cattails. Animals are distributed in relation to their salinity tolerances, vegetational habitat requirements, and tidal elevation within the marsh. Distribution of native species is complicated by competitive interactions and frequent dominance by introduced species. Preservation of remaining marshes requires careful management. Habitat requirements for selected species can be incorporated into management practices as well as carefully planned and executed restoration projects. 211 references, 45 figures, 29 tables.

31701 **(PB—84-144138) Turtles, birds, and mammals in the northern Gulf of Mexico and nearby Atlantic waters: an overview based on aerial surveys of OCS (Outer Continental Shelf) areas, with emphasis on oil and gas effects.** Fritts, T.H.; Irvine, A.B.; Jennings, R.D.; Collum, L.A.; Hoffman, W. (Fish and Wildlife Service, Albuquerque, NM (USA)). Jul 1983. 482p. (FWS/OBS—82/65). NTIS, PC A21/MF A01.

Library of Congress catalog card No. 83-600582.

Aerial line transect surveys of marine turtles, birds, and mammals were conducted in four areas of the Gulf of Mexico and nearby Atlantic waters. Areas surveyed were 111 km by 222 km and located off Brownsville, Texas; Marsh Island, Louisiana; Naples, Florida; and Merritt Island, Florida. Data on distribution, abundance, seasonal occurrence, and habitat use are reported in accounts for each of the 88 species observed. Information on reproduction, behavior, and potential impacts of Outer Continental Shelf (OCS) development are also discussed.

31702 **(PB—84-152768) Ground water management in the southeastern United States. Final report.** Devine, M.D.; Ballard, S.C.; Achilladelis, B.G.; Butler, L.M.; Canter, L.W. (Oklahoma Univ., Norman (USA). Science and Public Policy Program). Sep 1983. 533p. NTIS, PC A23/MF A01.

This study characterizes current and potential ground-water resource problems in North and South Carolina, Georgia, Florida, Alabama, Mississippi, Tennessee, and Kentucky. It discusses those issues that could constrain development or adversely affect environmental quality or human health in the eight-state area. It contains case studies illustrating how several state and local governments are dealing with ground-water problems and assesses the applicability of these experiences to other areas. It addresses ground-water quality in relation to hazardous waste disposal, nonpoint source pollution, monitoring strategies and deficiencies, and drinking water quality.

31703 **(PB—84-152875) Habitat structure and fish communities of warmwater streams.** Karr, J.R.; Schlosser, I.J.; Angermeier, P.L. (Illinois Univ., Urbana (USA). Dept. of Ecology, Ethology and Evolution). Sep 1983. 8p. NTIS, PC A02/MF A01.

The basic goal of recent clean water legislation is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. A research program was initiated to evaluate the role of physical habitat in regulating the structure of fish communities in warmwater streams in east-central Illinois. An empirical approach involving observations of fish in relatively natural conditions was combined with studies of stream areas that have been subjected to extensive modification by human society. This report is a summary of the work relating to this research.

5202 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 31646, 31688, 31813

31704 (ANL—82-65-Pt.3, pp 54-57) **Comparison of dynamic and mass-loading models used for long-term prediction of Lake Michigan water quality.** Lesht, B.M. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

The key parameter for phosphorus removal from Lake Michigan, both in the dynamic eutrophication model and in the mass-balance model, is particle settling or removal rate. In both cases these values are arrived at empirically. In our study using the dynamic model, we found that the model prediction to match observations, the base removal rate must be increased by a factor of eight during the period that the lake is ice covered. 3 references, 2 figures.

31705 (ANL—82-65-Pt.3, pp 58-62) **Box-Jenkins modeling of Chicago water intake phosphate data 1966-1982.** Lesht, B.M. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

Considerable effort and expense have been expended to control municipal and industrial phosphorus inputs to the Great Lakes. For example, several states and municipalities have banned the use of phosphate detergents and have diverted waste-treatment effluents from lake outfalls. As part of our work involving model forecasts of Lake Michigan water quality and the response of the lake to phosphorus controls, we have begun a study using classical methods of time-series analysis to evaluate a detailed set of water quality data - the monthly phosphorus measurements made at the Chicago water intake. This report presents some of the preliminary results of that study. 1 reference, 3 figures, 1 table.

31706 (ANL—82-65-Pt.3, pp 63-66) **Ten-year forecasts of water quality in Lake Michigan using a deterministic model and Monte Carlo inputs.** Lesht, B.M. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

The primary purpose of our Lake Michigan eutrophication model is longterm prediction of the response of the lake to changes in phosphorus loading. Previous work has shown that the output depends both on the assumed phosphorus loads and on assumptions concerning the severity of yearly winter conditions. The five-year hindcast demonstrated the importance of accounting explicitly for winter removal processes that affect the springtime concentrations of phosphorus and of phytoplankton in the lake. In this report we extended this application to ten-year forecasts of water quality. In addition to using the deterministic model to estimate limits of the lake response to different combinations of phosphorus load and winter conditions, we used Monte Carlo techniques. 2 references, 2 figures, 2 tables.

31707 **(DP-MS—84-35) Groundwater pollution control.** Steele, J.L. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 3 May 1984. Contract AC09-76SR00001. 29p. (CONF-8405152—1). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011513.

From Du Pont environmental forum; Wilmington, DE, USA (3 May 1984).

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Chlorinated organic compounds (trichloroethylene, tetrachloroethylene, and 1, 1, 1 trichloroethane) were discovered in the groundwater beneath the reactor fuel and target fabrication area at the Savannah River Plant in June 1981 during routine RCRA monitoring. Principal sources and contaminant location were identified along with air stripping as the remedial action technology. A pilot air stripping column with one recovery well was installed to evaluate air stripping and a 50 gpm production unit with two recovery wells was installed to expedite contaminant recovery. A 400 gpm air stripping column and eleven recovery wells are in the design stage and will be operational in the first quarter of 1985.

31708 **(NP—4901166) Geochemistry of ground water in the Miocene Oakville Sandstone: a major aquifer and uranium host of the Texas Coastal Plain.** Henry, C.D.; Galloway, W.E.; Smith, G.E.; Ho, C.L.; Morton, J.P.; Gluck, J.K. (Texas Univ., Austin (USA). Bureau of Economic Geology). 1982. 66p. Bureau of Economic Geology, Univ. of Texas, Austin, TX 78712. Order Number TI84901166.

Report of Investigations No. 118.

The Oakville Sandstone is a major aquifer and a major host of uranium deposits in the Texas Coastal Plain. This report discusses the geochemistry - including major ions, the trace elements uranium, molybdenum, arsenic, and selenium, and oxidation-reduction potential - of Oakville ground water to evaluate the potential effect of uranium mining on water quality. Ground-water chemistry was investigated both regionally and in two major uranium mining districts. Major ion composition of Oakville ground water shows a regional variation. There are three oxidation-reduction zones within the Oakville: (1) an oxidizing zone with Eh values greater than 300 mV, controlled by the presence of measurable concentrations of dissolved oxygen; (2) an intermediate zone with Eh values between 110 and 10 mV, probably controlled by ferrous-ferric mineral reactions; and (3) a reducing zone with Eh values less than -40 mV, probably controlled by the presence of FeS_2. Uranium, molybdenum, arsenic, and selenium show regional variations in concentrations, with trace element values in South Texas water distinctly higher than in East Texas water. Analysis of water chemistry around the two uranium mining districts gives results similar to those found in the regional study. Very high concentrations of trace elements occur only in a few samples within ore zones. These high concentrations probably result from natural dispersal from the deposits, although this is not a widespread phenomenon. 65 references, 21 figures, 9 tables.

31709 **(PB—83-141564) Effects of acid precipitation on aquatic resources: results of modeling workshops.** (Fish and Wildlife Service, Kearneysville, WV (USA). Eastern Energy and Land Use Team; Fish and Wildlife Service, Fort Collins, CO (USA). Western Energy and Land Use Team). Jul 1982. 149p. (FWS/OBS—80/40.12). NTIS, PC A07/MF A01. Order Number TI84901186.

Portions are illegible in microfiche products; Air Pollution and Acid Rain Report No. 12.

This publication reports on a series of Adaptive Environmental Assessment (AEA) workshops on acid precipitation, sponsored by the US Fish and Wildlife Service's National Power Development Group. The report identifies priority research needed for a better understanding of the acidification process and its impacts on aquatic resources of watershed ecosystems. A preliminary computer simulation model, developed through the workshop process and designed to describe and integrate the mechanisms by which acid precipitation alters stream and lake chemistry and impacts fish populations and other aquatic components, is presented. 155 references, 54 figures, 4 tables.

31710 **(PB—84-120005) Liming of acidified waters: a review of methods and effects on aquatic ecosystems. Final report.** Fraser, J.E.; Britt, D.L. (General Research Corp., McLean, VA (USA)). Dec 1982. 208p. (FWS/OBS—80/40.13). NTIS, PC A10/MF A01. Order Number TI84901195.

Air pollution and acid rain, report No. 13.

The report summarizes current information on liming and how it relates to aquatic habitats that are potentially impacted by the acidification process. Primary emphasis is on the fishery resource. Liming is defined as the addition of any base material to neutralize surface waters, sediments, and soils. Introductory information discusses acid-sensitive regions and associated aquatic fisheries and the effects of acidification on fish. The remaining chapters address preventative and mitigative liming, liming techniques, ecological responses to liming of aquatic ecosystems, and information needs. The report also includes appendices which provide a summary of liming projects in the northeastern and midwestern states; a listing of state, federal, and private sector contacts to facilitate liming projects; and a review and evaluation of models and predictive techniques for establishing liming requirements. 225 references, 20 figures, 20 tables.

31711 **(PB—84-144955) Caustic dry peeling of cling peaches to reduce water pollution: its economic feasibility. Agricultural economic report.** Gray, L.R.; Hart, M.R. (Economic Research Service, Washington, DC (USA). Marketing Economics Div.). Dec 1972. 43p. NTIS, PC A03/MF A01.

The economic feasibility of a new caustic dry method of peeling cling peaches is examined. The dry-peel method, developed as an alternative to the currently used wet-peel method, is designed to reduce the pollution in fruit canneries' wastewaters.

31712 **(PB—84-148634) Analysis of survey data on the chemistry of twenty-three streams in the Chesapeake Bay watershed: some implications of the impact of acid deposition. Final report.** Janicki, A.; Cummins, R. (Martin Marietta Corp., Baltimore, MD (USA). Environmental Center). Dec 1983. 78p. NTIS, PC A05/MF A01.

See also PB83-249375.

A survey of the chemistry of 23 streams within the Chesapeake Bay watershed was conducted in the spring of 1983 to determine whether a potential for changes in water chemistry due to atmospheric inputs of acidic materials exists in any of these streams. Sampling was conducted weekly through the months of March and April. Three streams were identified as being likely affected by acid inputs due to relatively high H(+) and SO4(-2) concentrations and low alkalinities: Stockett's Run, Lyons Creek, and Muddy Creek. Elevated dissolved aluminum concentrations were observed in some Eastern Shore streams and are likely related to the predominance of clay soils in their watersheds.

31713 **(PB—84-149095) Health hazard evaluation report No. HETA 81-399-1172, Ridgway Color Company, Ridgway, Pennsylvania.** Cherniack, M.; Lewis, F. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Aug 1982. 29p. NTIS, PC A03/MF A01.

There was concern that workers at the Ridgway Color Company were experiencing an unusually high rate of death from cancer. This concern was compounded by the identification of 3,3'-dichlorobenzidine (DCB) as a suspect carcinogen by OSHA, since DCB had previously been handled in the plant as a benign chemical intermediate. Urine samples were also collected to detect any presence of DCB. The environmental evaluation consisted of (1) area and personal air sampling for DCB, hydrochloric acid (HCL), and total dust, (2) analysis for trace contamination with potential carcinogens in bulk samples of pigment intermediate, (3) analysis of diarylide yellow presscake for DCB, and (4) a characterization of ventilation and work practices.

31714 **(PB—84-149277) Reference materials for water and wastewater analyses in USEPA (U.S. Environmental Protection Agency).** Winter, J.A. (Environmental Protection Agency, Cincinnati, OH (USA). Environmental Monitoring and Support Lab.). Jan 1984. 24p. NTIS, PC A02/MF A01.

The Environmental Monitoring and Support Laboratory at Cincinnati provides quality assurance support for EPA's water-related programs in response to the Clean Water Act, the Safe Drinking Water Act, the Marine Protection, Research and Sanctuaries Act, the Resources Conservation and Recovery Act, the Comprehensive Environmental Response Compensation and Liability Act, and the Toxic Substances Control Act. Two important segments of this support are: (1) the Quality Control (QC) Sample Program which provides samples of known concentrations for use as independent Hazardous Materials which provides calibration standards for trace organic analyses of interest to the Agency. The samples and standards are prepared as stable concentrated solutions in all-glass ampuls. Each series contains one or more related analyses, each with a true or reference value. These are provided for dilution to volume and analyses as needed by EPA, EPA contractor/grantees, and other federal, state and local agencies.

5203 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 30345, 30358, 30384, 31646, 31691, 31692

31715 (ANL—82-65-Pt.3, pp 31-36) **Flux of plutonium from sediments to water in Lake Michigan.** Nelson, D.M.; Metta, D.N. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

Measurements of ^{228}Th and ^{234}Th have now been completed on samples of water collected from offshore locations in Lake Michigan. Data shows a remarkable uniformity in the concentration of ^{228}Th. With the exception of the samples collected above the thermocline during stratification, the ^{228}Th concentration is within the range of 0.5 to 1.0 fCi/L. Between 60% and 100% of the ^{228}Th was associated with suspended particulate matter, with the lowest values occurring in the water samples having the lowest concentrations of suspended particles. 2 references, 3 tables.

31716 (ANL—82-65-Pt.3, pp 37-44) **Plutonium solubility in natural waters.** Nelson, D.M.; Larsen, R.P.; Karttunen, J.O. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

We have shown that the solubility of plutonium exceeds 1 x 10^{-8} M in both Lake Michigan and the Argonne National Laboratory pond water when natural particulate matter is present. 1 reference, 1 figure, 1 table.

31717 (ANL—82-65-Pt.3, pp 45-48) **Plutonium concentrations in the Great Lakes: an update.** Nelson, D.M.; Metta, D.N. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

Data on plutonium concentration in Lake Michigan were last published in 1978. Summarized herein are the data collected since then and includes the earlier data from offshore locations for comparison. These most recent data are restricted to stations in excess of 20 km offshore. The slow decrease in total plutonium concentration noted in 1978 has continued through 1982 at a rate of ~ 5% per year. 4 references, 2 tables.

31718 (ANL—82-65-Pt.3, pp 49-53) **Behavior of plutonium and americium in two groundwater systems.** Nelson, D.M.; Orlandini, K.A.; Larsen, R.P. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

Two areas having measurable concentrations of americium and plutonium in groundwater are the Four Mile Creek floodplain on the Savannah River Plant site and the Mortendad Canyon at Los Alamos National Laboratory. Initial measurements of plutonium, americium, curium, and thorium in soil pore water at Four Mile Creek show that all four elements are present at measurable concentrations. Unlike the low-flow situation in the Four Mile Creek floodplain, in Mortendad Canyon the groundwater flow rate is substantial, and the progress of radionuclide migration can be monitored at several sampling wells downslope from the discharge. 4 references, 2 tables.

31719 (CEGB-TPRD/B—0189/N82) **Methods for assessing the long term radiological consequences of radionuclide entry into groundwater.** Maul, P.R. (Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.). Jan 1983. 49p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701709.

The methods have been developed to model the transport of radionuclides in groundwater, based on an analytical approach to the governing transport equations, are sufficiently general to enable assessments to be made of the long term radiological significance of groundwater contamination for a range of possible problems. Although the methods are not as flexible as those based on numerical solutions of the transport equations, they have several advantages, including reduced computing time. The methods described can be used to identify critical parameters and assess the significance of data uncertainties in ground-water transport calculations. Such an analysis, combined with experimental measurements where necessary, can provide a sound basis for assessing potential radiation hazards.

31720 (PB—84-148360) **Atmospheric fluxes and geochemistries of stable Pb, Pb-210, and Po-210 in Crystal Lake, Wisconsin: Wisconsin power plant impact study.** Talbot, R.W.; Andren, A.W. (Wisconsin Univ., Madison (USA)). Jan 1984. 117p. NTIS, PC A06/MF A01.

In a lake system where atmospheric input greatly exceeds other source inputs, the atmospheric supply, water column transport, and sediment accumulation should be coupled. This research examined the exchange of lead between these compartments. The approach was to use Pb-210 as a natural tracer to provide experimental evidence concerning the movement of lead between various compartments, thereby linking the geochemical regime of lead in an integrated lake system. The investigation was conducted in Crystal Lake, Wisconsin, an oligotrophic, non-calcareous, seepage lake located in a semi-remote, heavily forested area of north-central Wisconsin. The atmosphere serves as the principal route for transport of material to the lake. Stable Pb concentrations in the water column are of the order of 200 ng/kg.

31721 **Inventories of ^{239,240}Pu, ^{241}Am, ^{137}Cs, and ^{60}Co in Columbia River sediments from Hanford to the Columbia River estuary.** Beasley, T.M.; Jennings, C.D. (Oregon State Univ., Corvallis). *Environmental Science and Technology;* **18**: No. 3, 207-212(Mar 1984).

The inventories of ^{239,240}Pu, ^{241}Am, ^{137}Cs, and ^{60}Co in sediments of the lower Columbia River and its estuary have been estimated from the measured activities of these radionuclides in 50 cores raised in 1977-1978. Cobalt-60 activities are attributed to the operation of the now inoperative plutonium production reactors located on the Hanford Reservation in Washington State; the majority of the ^{239,240}Pu and ^{137}Cs activities and all of the ^{241}Am activity are derived from global fallout. At the time of sampling, the operation of the Trojan nuclear power plant near St. Helens, OR, had not introduced detectable amounts of these radionuclides to the sandy sediments downstream from the plant location. Despite the substantial, past addition of artificial radioactivity to the river from the Hanford reactors, present inventories of artificial radioactivity are small. Erosional processes within the river's drainage basin remove negligible quantities of fallout radionuclides to the ocean. 31 references.

5205 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 30356

31722 (TVA/ONRED/WRQ—84/1) **Water quality management plan for Cherokee Reservoir.** (Tennessee Valley Authority, Chattanooga (USA). Div. of Air and Water Resources). Jan 1984. 80p. NTIS, PC A05/MF A01. Order Number DE84901245.

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The management plan provides an assessment of Cherokee Reservoir's current water quality, identifies those factors which affect reservoir water quality, and develops recommendations aimed at restoring or maintaining water quality at levels sufficient to support diverse beneficial uses. 20 references, 8 figures, 15 tables. (ACR)

5206 Regulations

REFER ALSO TO CITATION(S) 31006, 31714

31723 (GAO/RCED—84-53) **Wastewater dischargers are not complying with EPA pollution control permits.** (General Accounting Office, Washington, DC (USA). Resources, Community and Economic Development Div.). 02 Dec 1983. 73p. US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760. Order Number TI84901115.

Report to The Administrator, Environmental Protection Agency.

The Clean Water Act's National Pollutant Discharge Elimination System limits the type and amount of pollution a municipal or industrial facility may legally discharge into the nation's waterways. Based on a review of 531 randomly selected major dischargers in six states, GAO estimated that 82 percent of these dischargers exceeded their permit limits at least once during an 18-month period and that 31 percent of the dischargers in the six states that exceeded permit limits for one or more pollutants did so by 50 percent or more for at least 4 consecutive months. The Environmental Protection Agency (EPA) relies on self-monitoring by dischargers to detect and report noncompliance. Because such information is not always provided or is incomplete, EPA and the states are not aware of all permit noncompliance and, thus, who should be subject to enforcement action. EPA and state enforcement policies frequently allow noncompliance to continue for long periods of time. In addition, EPA and state enforcement actions have declined. GAO makes several recommendations to the Administrator, EPA, for improving the permit program.

53 ENVIRONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES

REFER ALSO TO CITATION(S) 31647

5301 Social And Economic Studies

REFER ALSO TO CITATION(S) 30183

31724 (DOE/AD/11262—T1) **Distributional and socio-economic impacts of electricity price increases on the Puerto Rican population. Volume 2.** Rodriguez, E.; Ocasio, W.; Torres, S.; Zalacain, F.; Lugo, S. (Center for Energy and Environment Research, Mayaguez (Puerto Rico)). Mar 1983. Contract FG01-81AD11262. 183p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84002228.

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The purpose of this study is to analyze the socio-economic impacts of changes in energy prices and availability upon the low income minorities in Puerto Rico. This volume presents both the theoretical and empirical aspect of this research. Chapter two in-

cludes a review of the literature on the demand for electricity. Chapter three analyzes the present electricity rate structure and its implications on equity and energy conservation. In chapter four data available from the Puerto Rico Electric Power Authority is used to analyze the concentration of electricity consumption and, to estimate several models of demand functions fitted to be estimated with time-series data. Chapter five describes the household survey undertaken to get information on residential electricity consumption in Puerto Rico. The information obtained was used in chapter six to analyze several aspects of electric energy consumption in Puerto Rico. Among these: the price-consumption relationship, the income-consumption relationship, energy conservation patterns, subsidy impact on conservation, and equity considerations on the electricity consumption subsidy. These issues were examined using cross tabulation and regression analysis techniques. Finally, chapter nine (9) develops a simulation model to analyze the impact of different policy alternatives on electricity rate structures. 7 figures, 43 tables.

31725 **(DOE/BP—238) Economic analysis of the environmental effects of a combustion-turbine generating station at Frederickson Industrial Park, Pierce County, Washington. Final report.** (ECO Northwest (USA)). Apr 1984. Contract AC79-83BP11551. 69p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84011674.

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This report presents a case study of a combustion-turbine generator, fired primarily by natural gas. The study estimates the economic value of the environmental costs and benefits of this electricity-generating resource. The four major categories of impacts are air pollution, noise, accidents, and boomtown effects. A detailed economic analysis of these effects was conducted as they pertained to each element of the fuel cycle: fuel extraction, fuel transportation, plant construction and decommissioning, and plant operation. 87 references. (ACR)

5303 Environmental Impact Statements

31726 **(EPA—450/3-82-011b) Synthetic fiber production facilities: background information for promulgated standards.** (Environmental Protection Agency, Research Triangle Park, NC (USA). Emission Standards and Engineering Div.). Mar 1984. 64p. NTIS, PC A04/MF A01. Order Number DE84901072.

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Standards of performance to control emissions of volatile organic compounds (VOC) from new and reconstructed synthetic fiber production facilities are being promulgated under the authority of Section 111 of the Clean Air Act. This document contains a detailed summary of the public comments on the proposed standards (47 FR 52932), responses to these comments, and a summary of changes to the proposed standards. 2 tables.

55 BIOMEDICAL SCIENCES, BASIC STUDIES

5501 Behavioral Biology

REFER ALSO TO CITATION(S) 31813

5502 Biochemistry

REFER ALSO TO CITATION(S) 31733, 31742, 31789, 31800

31727 **(AD-A—137069/1) Development of an in vivo assay for mistranslation: Inducing activity of pollutants and characterization of amino acid substitutions. Annual scientific report, 1 August 82-31 July 83.** Reeve, J.N.; Rice, J.B. (Ohio State Univ., Columbus (USA). Dept. of Microbiology). 23 Nov 1983. 68p. NTIS, PC A04/MF A01.

In experiments directed toward development of a simple, quantitative in vivo assay for mistranslation-inducing activity of pollutants, we have established the natural level of cysteine misincorporation into the bacteriophage T7 encoded 0.3 protein. We have also shown that this level can be increased by altering the environment of the translation machinery. This can be accomplished either by growing cells in the presence of mistranslation-inducing antibiotics or by inducing mutations which cause defective ribosomal proteins into the cells being studied. The above results were obtained using purified 0.3 protein. Additional experiments directed toward the first objective have led to a second procedure for quantitating cysteine misincorporation into 0.3 protein. A radioimmunoprecipitation (RIP) assay was developed which used polyclonal antibodies to 0.3 protein, SDS-polyacrylamide gel electrophoresis (SDS-PAGE), and scanning densitometry. We are currently preparing monoclonal antibody to 0.3 protein to obviate the need for SDS-PAGE and scanning densitometry. Experiments directed toward the second overall objective have provided interesting preliminary results. Trypsinization of cysteine-labeled 0.3 protein analysis of fragments by SDS-PAGE have shown that new peptide fragments are produced.

31728 **(BNL—34674) Neutron scattering studies of the H2a-H2b and $(H3\text{-}H4)_2$ histone complexes.** Carlson, R.D. (Brookhaven National Lab., Upton, NY (USA)). 1982. Contract AC02-76CH00016. 26p. (CONF-8206240—5). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012173.

From Brookhaven symposium biology 32; Upton, NY, USA (1 Jun 1982).

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Neutron scattering experiments have shown that both the $(H3\text{-}H4)_2$ and H2a-H2b histone complexes are quite asymmetric in solution. The $(H3\text{-}H4)_2$ tetramer is an oblate or flattened structure, with a radius of gyration almost as large as that of the core octamer. If the tetramer is primarily globular, it must have an axial ratio of about 1:5. It is more likely, however, that this asymmetry results in part from N-terminal arms that extend outward approximately within the major plane of the particle. If this is the case, less asymmetric models for the globular part of the tetramer, including a dislocated disk, can be made consistent with the scattering data. The H2a-H2b dimer, on the other hand, is an elongated structure. 48 references, 12 figures, 1 table.

31729 **(DOE/ER/13114—1) Regulation of expression of a soybean storage protein subunit gene. Progress report.** Thompson, J.F.; Madison, J.T. (Department of Agriculture, Washington, DC (USA)). 23 Apr 1984. Contract AI05-83ER13114. 7p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012561.

We have found that the methionine repression of the β-subunit gene expression is not due to degradation of the β-subunit but is due to an effect on synthesis of the β-subunit. The effect of methionine on the synthesis of the β-is due to an inhibition of β-subunit mRNA synthesis. 3 references, 1 figure.

31730 **(IAEA-R—2503-F) Development of radioimmunoassay systems for the human pituitary gland. Final report for the period 1 March 1980 - 30 April 1983.** Simionescu, L. (International Atomic Energy Agency, Vienna (Austria)). Nov 1983. 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701859.

The aim of the study was the purification and preparation of human growth hormone (HGH), luteinizing hormone (LH), follicle stimulating hormone (FSH), and thyroid stimulating hormone (TSH), and prolactin. A standardised procedure for the preparation of HGH "clinical grade" was developed. This HGH can be applied for the treatment of children diagnosed as hypophyseal dwarfism; the preliminary results are encouraging. The final ethanol-soluble fraction is used also for the prolactin preparation. As shown by exclusion chromatography, the lyophilized HGH "clinical grade" contains mainly its monomeric form. The purified HGH obtained by processing of frozen glands is suitable as antigen for the preparation of antisera in rabbits. Large quantities of purified HGH were prepared, used as preparation for radioiodination, and proposed as a national reference preparation for immunoassay. The double antibody HGH-RIA system using author's procedure seems to be adequate for the HGH measurements in biological fluids. Using two

chromatographic steps (Sephadex G-150, DEAE-cellulose) followed by a preparative electrophoresis (P-PAGE) purified LH was obtained. The measurement of the β-TSH in the P-PAGE eluates showed concentrations lower than the sensitivity limit of the β-TSH RIA system (5microU/ml). The three chromatographic steps (Sephadex G-150, DEAE-cellulose and Sephadex G-100) allowed to separate the FSH from TSH during the third step, FSH being eluted faster than TSH, as resulted from the RIA measurements of the FSH and of β-TSH: Some overlapping of the concentrations of these hormones was observed only in eluates on the descending arm of the FSH peak. The procedure for the isolation and purification of prolactin was developed according to Hwang's method.

31731 (INIS-mf—8968, pp 247-256) **Study of electrophoresis on the basis of swarm analysis by using transport equations.** Dote, T. (Saitama Univ., Urawa (Japan)); Shimada, M. (Osaka Kyoiku Univ. (Japan)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The electrophoresis phenomenon in a cylindrical positive column has been theoretically investigated. An extensive improvement on the theory has been made from a view point of the momentum given to neutral particles from charged particles on the basis of the quasi-neutral theory of the positive column recently reported by the authors. According to this, for example, a general expression for the pressure gradient along the axis, and dependence of the pressure gradient on the mean pressure and the tube radius have been obtained. Furthermore, the diffusion cooling for positive ions theoretically predicted by the authors before has been verified by a comparison between calculated and experimental characteristics. (Authors).

31732 (ZfK—504) **Production of DNA strand breaks by ionizing radiation of different quality and their consequences for cell inactivation.** Kampf, G. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Jul 1983. 68p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701839.

The production of single- and double-strand breaks (DSB) in the DNA of Chinese hamster cells (V 79) was studied by use of 11 radiation qualities, with some also under hypoxic conditions. The aim was to find relations between the induction of lesions on the molecular level and the expression of this damage on the cellular level. The results suggest that release of DNA from the nuclear-membrane complex, induction of chromosome breaks, and cell inactivation are triggered by DSB. However, not simply a certain number of DSB in the DNA of the nucleus, but their cooperation within a small structural section of DNA is required for cell inactivation. Such sections may be the membrane-associated superstructure units. DSB produced under hypoxic conditions show a greater effectiveness than those produced under oxic conditions. The investigations with eukaryotic cells and bacteria suggest that not the entire DNA of all organisms but a structural unit common to them represents the critical target for radiation action.

5503 Cytology

31733 (BNL—34682) **Neutron diffraction and the decomposition of membrane scattering profiles into the scattering profiles of their molecular components.** Blasie, J.K.; Pachence, J.M.; Herbette, L.G. (Pennsylvania Univ., Philadelphia (USA); Brookhaven National Lab., Upton, NY (USA); Columbia Univ., New York (USA). Dept. of Biochemistry; Connecticut Univ., Farmington (USA). Div. of Cardiology). 1982. Contract AC02-76CH00016. 10p. (CONF-8206240—4). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012176.

From Brookhaven symposium biology 32; Upton, NY, USA (1 Jun 1982).

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We have utilized a manipulation of the neutron scattering contrast of individual membrane components via selective deuteration in order to directly derive the separate scattering profiles of molecular components within both isolated and reconstituted membranes. 10 references, 3 figures, 1 table.

5505 Metabolism

REFER ALSO TO CITATION(S) 31796, 31801, 31803, 31815

5506 Medicine

REFER ALSO TO CITATION(S) 31563

31734 (EHD—82-81) **Radiation hazard control in hospitals. Training manual I.** Denley, H.V. (Department of National Health and Welfare, Ottawa, Ontario (Canada). Health Protection Branch). Feb 1981. 99p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84701857.

This manual is designed to aid in the training of hospital personnel engaged in work with the more common sources of ionizing radiation. It emphasizes the essentials of safety procedures for users of radioisotopes and x-rays.

31735 (HRP—0904746/5) **Nuclear magnetic resonance (NMR) guidelines.** Halpern, R. (Health Planning Council for Greater Boston, Inc., MA (USA)). Dec 1983. 49p. NTIS, PC A03/MF A01.

Nuclear Magnetic Resonance (NMR) is a medical diagnostic imaging technique that applies the atomic principles of magnetic spin to visualize and analyze disease states in bodily tissues. NMR differs from the radiological devices in that (a) it does not utilize potentially harmful ionizing radiation, and (b) it has the capacity to not only produce anatomical images but also to generate biochemical data. NMR devices are very versatile in the ways they can generate, process and present information; manufacturers are developing several kinds of units with different magnets, field strengths, and operational parameters. At this time there are no definitive guidelines on how NMR should be operated for optimal results, even for the most basic clinical applications.

31736 (INIS-mf—8723) **Computerized tomography of intracranial tumors. Problems and limitations.** Hungenberg, T. (Koeln Univ. (Germany, F.R.). Medizinische Fakultaet). 7 Jun 1982. 230p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE84780281.

The author discusses the possibilities and limits of CT in the differential diagnosis of intracranial tumours. His discussion is based on a quantitative classification and a number of case studies selected under the following aspects: Misinterpretation of the CT image; specific diagnostic problems; uncommon CT image of the tumour; rare histological findings. 118 patients were examined between November 1976 and April 1979. (orig./MG).

31737 (INIS-mf—8729) **Experimental studies for the development of a new method for stroke volume measuring using X-ray videodensitometry.** Odenthal, H.J. (Kiel Univ. (Germany, F.R.). Medizinische Fakultaet). 21 Jun 1982. 43p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780282.

Quantitative videodensitometry was studied with a view to its possible application as a new, non-invasive method of measuring cardiac stroke volume. To begin with, the accuracy of roentgen volumetric measurements was determined. After this, blood volume variations were measured by densitometry in five animal experiments. The findings were compared with the volumes measured by a flowmeter in the pulmonary artery. The total stroke volume was found to be proportional to the difference between the maximum and mean densitometric volume. A comparison between videodensitometry and other non-invasive methods showed that, in a stable circulatory system, the results of videodensitometry are equally reliable as, or even more reliable than, those of the conventional methods. (orig./MG).

31738 **(INIS-mf—8732) 'new' Radiation Protection Ordinance - marking the difference between application of 'radioactive substances in medical research' (Section 41 StrlschV) and 'radioactive substances or ionizing radiation in medicine and dental medicine' (Section 42 StrlschV).** Roedern, P. (Kiel Univ. (Germany, F.R.). Rechtswissenschaftliche Fakultaet). 14 Mar 1983. 115p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780286.

The main differences in the provisions are to be found under the following aspects: - Observation of dose limits; - Necessity of physical radiation protection surveillance; - Obligation to apply for approval in individual cases; - Selection of test persons/patients; - Scope of conditions governing approval; - Obligation to inform about hazards. The unambiguous definition of procedures and purposes allowed in the field of medical research, and of those in the field of medical therapy (including dental medicine) is of crucial importance, due to its significance with regard to radiation protection, civil law and penal law. Marking the limits between these two fields subject to supervision is a precondition allowing the proper application of relevant laws in the field of use and handling of radioactive substances or ionizing radiation for medical purposes. (orig./HSCH).

31739 **(INIS-mf—8742) Statistical frequency analysis to obtain guiding values for the basic planning of X-ray diagnostic departments.** Matschurat, T. (Muenchen Univ. (Germany, F.R.). Fachbereich Medizin). 17 Dec 1981. 72p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84780370.

The aim of this work is to provide figures serving as an appropriate basis for adjusting new X-ray departments set up in size and equipment to the prospective requirements. The percentage of stationary patients among the total collective of patients remained constant from 1975 to 1976 and amounted to 75%. In both years around 78% of all examinations were carried through on this group. Total check-ups rose from 1975 to 1976 by 17%, i.e. more than the corresponding increase in patient number. The check-up done most frequently was the thoracal one (40% in both years) followed by X-ray screening, which almost doubled in relative figures from 1975 (9%) to 1976 (16%).

31740 (INIS-mf—8902, pp 81) **Cardiokymography and radionuclide ventriculography of patients with coronary diseases.** Fridrich, L.; Gassner, A.; Sykora, J.; Pichler, M. (Rehabilitationszentrum der Pensionsversicherungsangestellten, Hochegg (Austria)). 1983. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780308. (CONF-8309215—Absts.).

From Joint annual meeting of the Austrian Society for Internal Medicine, the Austrian Rheumatologic League and the Austrian Society for Nuclear M; Salzburg, Austria (22 Sep 1983).

31741 **(OEFZS—4245) Austrian Italian cooperation in radiation protection dosimetry.** Duftschmid, K.E. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Oct 1983. 10p. (In German). (ST—109/83). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701856.

The Austrian Dosimetry Laboratory established and operated by the Institute of Radiation Protection at the Research Center Seibersdorf and the Austrian National Office of Measures has been in close cooperation with the Italian Dosimetry Laboratories of ENEA in Bologna and Casaccia since almost 5 years. This cooperation includes intercomparison of primary standards for exposure i.e. free-air-parallel-plate-chambers and graphite cavity chambers for medium energy X-rays and ^{60}Co. Equipment designed at the Austrian Dosimetry Laboratory, i.e. primary and secondary standard dosimetry systems, is presently used in both Italian laboratories. In future this cooperation will be extended to absorbed dose determination by portable graphite calorimeters developed at the Austrian laboratory. The paper describes details of the dosimetric equipment and results of the intercomparison measurements.

5507 Microbiology

REFER ALSO TO CITATION(S) 30439, 30455, 30474, 30516, 31811

31742 **(IAEA-R—2477-F) Schistosoma mansoni; relationship between membrane turnover rates and susceptibility to immune damage. Part of a coordinated programme on preparation of irradiated vaccines against some human diseases. Final report for the period 1 December 1979 - 31 August 1982.** Pereira Tavares, C.A. (International Atomic Energy Agency, Vienna (Austria)). Nov 1983. 26p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701843.

It is known that the schistosomulum of Schistosoma mansoni become refractory to damage by antibody and complement in vitro in the presence of serum, or Concanavalin A (Con A), or after contact with host tissues, presumably due to intrinsic changes in the surface membrane. This project studied the effect of dialysed fetal calf serum (DFCS) and Con A on the synthesis and turnover of individual proteins in the surface membrane using the incorporation of ^{14}C- and ^{3}H-labelled arginine and the separation of the membrane proteins in SDS-PAGE. The results indicate that during the period in which schistosomules become resistant to immune attack, no qualitative alterations in electrophoretic patterns of surface proteins were observed. There was, however, a marked heterogeneity in synthesis and degradation among constituent proteins. In addition, Con A which had been shown to be effective in stimulating loss of susceptibility to immune attack, caused a slight decrease in the synthesis and turnover rate of high molecular weight proteins, whilst DFCS increased synthesis and turnover of low molecular weight proteins. This suggests that at least two processes occur in the membrane which may be related to the development of protection against immune attack. Serum might stimulate the loss of crucial antigens by accelerating their turnover making antibody attachment difficult, and Con A could be stabilizing the membrane by crosslinking large macromolecules. It is possible that in vivo both mechanisms occur to make the schistosomule surface refractory to damage.

31743 **(IAEA-R—3197-F) Radiotracer studies on the degradation and dissipation of lindane under Malaysian environment. Part of a coordinated programme on the fate of persistent pesticides in the tropics, using radioisotopes. Final report for the period 1 September 1982 - 31 August 1983.** Jamaluddin, M.D. (International Atomic Energy Agency, Vienna (Austria)). Nov 1983. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701844.

A protocol was designed to provide information on rates of dissipation and degradation of lindane (γ-isomer of 1,2,3,4,5,6-hexachlorocyclohexane), a chemical used in Malaysia for pest control in rice paddies. The parameters studied included adsorption to three Malaysian soils, volatilization, degradation, dissipation through leaching and terminal residues in the grain. ^{14}C-labelled lindane was used after mixing with appropriate concentrations of the cold chemical. Standard nuclear techniques such as liquid scintillation counting and radiochromatography were applied. Adsorption of lindane to soil decreased in the order clay>sandy clay>loam>sandy loam. Volatilization of lindane was proportional to the chemical concentration and was more rapid in non-flooded and sterilized flooded soils. Under flooding conditions, microorganismal activities seem to play a dominant role in the disappearance, possibly degradation, of lindane. The half-life of lindane in non-sterilized flooded soil ranged from 10.5 to 34.5 days depending on the type of soil. The chemical residue in the grain was well below the maximum residue level. This is part of a project designed to provide data on the degradation and dissipation of lindane in the Malaysian environment in an attempt to pass a realistic judgement as to its persistence.

5509 Pathology

31744 (IAEA-R—2208-F) Regional intercomparison for quality control of radioassays used in thyroid studies. Part of a coordinated programme on quality control of techniques in in-vitro assay of thyroid related hormones. Final report for the period 1 October 1978 - 31 August 1982. Fiori, A.M. (International Atomic Energy Agency, Vienna (Austria)). Jan 1983. 129 p.p. NTIS (US Sales Only), PC A07/MF A01. Order Number DE84701846.

The project dealt with serious variabilities of the results of the radioimmunoassay (RIA) technique presented by different laboratories. The educational purpose of the project was to get users of RIA methods to become aware of the necessity of rigorous internal and external quality control practice. Two hundred and four sera aliquots were distributed among the participants of the project. The first batch consisted of 60 tubes, which were frozen. All others were lyophilized. The first batch consisted of pooled sera with low and high concentrations of T3 and T4, and unknown concentration of TSH. The second and third batches consisted of aliquots of normal sera for T3, T4 and TSH. The fourth batch consisted of coded aliquots of high and low concentrations of T3, T4 and TSH. All data from the participants (laboratories represented the Southern Region of Brazil and Uruguay) were collected and analyzed statistically; a special computer programme was developed for that purpose. Quarterly reports were sent to each laboratory with comments and suggestions aiming at the improvement of the performance of the laboratory in question. A high degree of irregularity in the first reporting results was observed. Individual values for T3 ranged from 0 to 176 nanog/dl with a coefficient of variation of 36.5%. Values for T4 ranged from 3.99 to 7.17 microg/dl with a coefficient of variation of 9.5%. Values for TSH ranged from 0 to 6.71 microU/dl with a coefficient of variation of 75.6%. The variability of results in different laboratories is probably caused by several reasons such as different kit's manufacturers, different standards, different antibody preparation, different separation methods. The educational part of the project seems to be rather successful. The performance of laboratories improved with time. This also demonstrates the need for intra-laboratory quality control.

31745 (INIS-mf—8727) In vitro autoradiographic studies for determination of mitotic index and labelling index in biopsies of the human oral mucosa. Etzbach, T. (Duesseldorf Univ. (Germany, F.R.). Medizinische Fakultaet). 1980. 50p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780279.

In order to find the most favourable method of incubation for in-vitro autoradiographies of biopsies of human oral mucosa, tissue biopsies were taken from oral mucosa transplants of 10 patients (7 females, 3 males) and either fixed or incubated at once. The author then investigated the mitotic index of the non-incubated tissue specimens, the mitotic index of the tissue specimens incubated in atmospheric conditions (A), and the mitotic index of the tissue specimens incubated under pressure (B). Simultaneously, autoradiographs of the incubated tissue specimens were prepared in order to determine their labelling indices. The mitotic indices of the non-incubated tissue specimen were found to differ significantly from those of the A-incubated tissue specimens. A similar difference was found between the mitotic indices of the A- and B-incubated tissue biopsies. Further, the labelling indices of A autoradiographs differed significantly from the labelling indices of B autoradiographs. The findings suggest that incubation with an excess oxygen pressure of 2 bar is the method of choice for in-vitro studies of human oral mucosa as the cells retain their specific activity and cell processes will continue unhindered. Further, the findings can be transferred to in-vivo conditions with a reasonable error rate. (orig./MG).

31746 (INIS-mf—8728) Postmortum incorporation of ^{3}H-thymidine into human oral mucosa at +4°C ambient temperature. Histoautoradiographic studies. Schmack, M.A. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Medizinische Fakultaet). 24 May 1982. 45p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780280.

The postmortal behaviour of the skin was studied under the conditions of 'normal' autolysis. Skin samples with a diameter of 3 mm were taken every 2 or 4 hours in the period between 1 and 56 h p.m. or between 48 and 100 h p.m. The incorporation of ^{3}H-thymidine, represented by the quotient of labelled germ layer cells per 100μ length of basal membrane, was studied in situ as a function of the time interval between death and sampling, using histoautoradiographs. Postmortal incorporation into the oral mucosa was higher by a factor 3 to 5 than incorporation into the epidermis; similar results were obtained in vivo. Experiments on refrigerated skin showed a strong temperature influence on the decrease of epithelial DNA synthesis activity. At +4°C, it continued for more than 4 days in the oral mucosa, showing an undulating course of the 'proliferation activities'. (orig./MG).

31747 Helminthosporium maydis T toxin decreased calcium transport into mitochondria of susceptible corn. Kimber, A.; Sze, H. (Univ. of Kansas, Lawrence). *Plant Physiology;* **74:** No. 4, 804-809(Apr 1984). Contract AS05-82ER13015.

The effects of purified Helminthosporium maydis T (HmT) toxin on active Ca^{2+} transport into isolated mitochondria and microsomal vesicles were compared for a susceptible (T) and a resistant (N) strain of corn (Zea mays). ATP, malate, NADH, or succinate could drive $^{45}Ca^{2+}$ transport into mitochondria of corn roots. Ca^{2+} uptake was dependent on the proton electrochemical gradient generated by the redox substrates or the reversible ATP synthetase, as oligomycin inhibited ATP-driven CA^{2+} uptake while KCN inhibited transport driven by the redox substrates. Purified native HmT toxin completely inhibited Ca^{2+} transport into T mitochondria at 5 to 10 nanograms per milliliter while transport into N mitochondria was decreased slightly by 100 nanograms per milliliter toxin. Malate-driven Ca^{2+} transport in T mitochondria was frequently more inhibited by 5 nanograms per milliliter toxin than succinate or ATP-driven Ca^{2+} uptake. However, ATP-dependent Ca^{2+} uptake into microsomal vesicles from either N or T corn was not inhibited by 100 nanograms per milliliter toxin. Similarly, toxin had no effect on proton gradient formation ([^{14}C]methylamine accumulation) in microsomal vesicles. These results show that mitochondrial and not microsomal membrane is a primary site of HmT toxin action. HmT toxin may inhibit formation of or dissipate the electrochemical proton gradient generated by substrate-driven electron transport or the mitochondrial ATPase, after interacting with a component(s) of the mitochondrial membrane in susceptible corn.

5530 Agriculture And Food Technology

REFER ALSO TO CITATION(S) 31648, 31743, 31784

31748 (RISO-M—2379) Agricultural Department annual report 1982. (Risoe National Lab., Roskilde (Denmark)). Mar 1983. 59p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84770254.

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Items within the scope of EDB have been entered individually into the data base. (ACR)

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

REFER ALSO TO CITATION(S) 31802, 31804, 31817

31749 (AECL—7760) Follow-up of CRNL employees involved in the NRX reactor clean-up. Werner, M.M.; Myers, D.K.; Morrison, D.P. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Jul 1982. 16p. (CONF-8205253—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701840.

From 3. annual meeting of the Canadian Radiation Protection Association; Vancouver, B.C., Canada (4 May 1982).

Data available to date on the mortality of continuing and retired employees of the Chalk River Nuclear Laboratories are con-

sistent with the Σhealthy workerΣ effect that has been observed in similar studies at other nuclear facilities. Because of an accident at the NRX research reactor in December 1952, the reactor was largely dismantled and rebuilt in 1953-54. These operations involved appreciable radiation exposures to a number of employees. The follow-up of the 850 on-site AECL staff involved in the clean-up has indicated that there were no unusual patterns in the mortality of this group when compared with those of the general population of Ontario.

31750 **(AECL—7901) Follow-up of AECL employees involved in the decontamination of NRU in 1958.** Werner, M.M.; Myers, D.K.; Morrison, D.P. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Sep 1982. 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701841.

In May 1958 the NRU reactor hall was badly contaminated by a damaged fuel rod that broke apart during its removal from the reactor. Radioactive fission products were spread around the reactor hall and into adjacent areas when a piece of the fuel rod fell into the maintenance pit and burned. AECL staff and others completed the decontamination in 2 1/2 months. This paper reports the results of a follow-up study of the AECL participants. No statistically significant increases in deaths from cancer or other diseases were found in this group.

31751 **(BARC—1199) Radiological Protection Dosimetry Section report of work done and list of publications during 1981-1982.** Krishnan, D.; Venkataraman, G. (Bhabha Atomic Research Centre, Bombay (India)). 1983. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701716.

Radiological Protection Dosimetry Section has as its objective the development of dosimetric techniques, theoretical as well as experimental. To this end research and development work is being done on chemical and neutron dosimetry systems, computational dosimetry and dosimetry associated with protection problems. Work is also carried out on radiobiological investigations at cellular level to understand radiation damage and interpret the basis of radiation exposure limits and attendant safety standards. These topics are covered by five groups in the section viz. Neutron Dosimetry, Chemical Dosimetry, Radiation Biophysics, Radium Hazards Evaluation and Control, and Theoretical studies. A brief outline of the activities of each of the above groups is given along with a list of publications for the last two years.

31752 **(CONF-840512—10) Model for the age-dependent skeletal retention of plutonium.** Leggett, R.W.; Eckerman, K.F. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 5p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012354.

From 6. congress of the International Radiation Protection Association; Berlin, F.R. Germany (7 May 1984).

A mathematical model of the metabolic and physiologic processes involved in the retention and translocation of plutonium in the body. The implications of the model concerning the dose as a function of age to radiosensitive tissues of the skeleton are examined. 16 references, 1 figure. (ACR)

31753 **(DOE/ER/60142—1) Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.** (Columbia Univ., New York (USA). Radiological Research Lab.). Jul 1983. Contract AC02-83ER60142. 358p. NTIS, PC A16/MF A01. Order Number DE83015574.

A wide range of research is carried out at the Radiological Research Laboratory, from computer simulation of particle tracks to the determination of oncogenic transformation in mammalian cells. Mechanistic studies remain the central mission in an attempt to understand the biological action of ionizing radiations. Collaborative research is carried out on the use of radiosensitizers on chemosensitizers on the effect of hormones on oncogenic transformation and on cataractogenesis.

31754 (DOE/ER/60142—1, pp 27-30) **Dosimetry for measurement of the relative biological effectiveness of photons from encapsulated ^{125}iodine using C3H 10T1/2 cells.** Goldhagen, P. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

A new determination of the RBE of ^{125}Iodine photons has now been done here using plateau phase mouse C3H/10T1/2 cells. The apparatus and dosimetry technique for the new study were basically the same as for the earlier measurements with two exceptions: commercial polystyrene cell culture dishes were used instead of special home-made dishes and, although dose rates were measured as well as calculated, this time we used the calculated dose rates. The significance of these two changes are discussed. 30 references.

31755 (DOE/ER/60142—1, pp 90-104) **Analysis of the soft x ray experiments.** Zaider, M. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

The analysis presented shows that soft x-ray data are consistent with the Theory of Dual Radiation Action formulation, in which the coefficient β is a constant that is independent of the type of photon field used. The function γ (x) is highly skewed toward small values of x which is in agreement with the analysis of the molecular beam experiment. 8 references, 6 figures.

31756 (DOE/ER/60142—1, pp 133-138) **Alpha-particle irradiations of C3H/10T1/2.** Bird, R.P.; Abramson, B.J.; Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Survival curves for Cs-137 gamma irradiation and for alpha-irradiation were obtained. The higher doses of alpha-particles were given in 2 or 3 minute exposure combinations interrupted with the addition of growth medium and re-aspiration of the medium in order to prevent drying out of the cells. Two observations were apparent: a slight increase in number of transformants per surviving cell was obtained with increased dose of alpha particles, and no apparent difference resulted between the two approaches of irradiation at low or high cell density. 4 references, 2 figures.

31757 (DOE/ER/60142—1, pp 139-142) **Therapeutic neutron beams generated by p+ → Be or d+ → Be.** Bird, R.P.; Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

This experiment sought to directly compare the biological response of the thin-target proton generated beam of neutrons at depths of 2 cm and 12 cm in a lucite phantom was undertaken at the Cleveland NASA cyclotron using Chinese hamster V79 cells. Figure RB-2-1 displays the cell survival results obtained. There is no significant difference in the effectiveness per dose at the two positions in contrast to the results obtained previously with the unfiltered, thick-target beam. 2 references, 1 figure, 1 table.

31758 (DOE/ER/60142—1, pp 143-155) **Modifiers of free radicals inhibit in vitro the oncogenic actions of x-rays, bleomycin, and the tumor promoter 12-0-tetradecanoylphorbol 13-acetate.** Borek, C. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

We have shown that oncogenic transformation induced by x-rays or bleomycin and the enhancement of transformation by phorbol esters (TPA) can be inhibited by superoxide dismutase (SOD). SOD catalyzes the conversion of the superoxide radical (0_2^-) to H_2O_2 plus O_2, and H_2O_2 is removed by catalase. The present results suggest that SOD plays an inhibitory role in oncogenic transformation by inhibiting promotion. 33 references, 2 figures, 2 tables.

31759 (DOE/ER/60142—1, pp 168-177) **Dose rate effect in mammalian cells.** Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Cell survival data were obtained fom experiments in which CHO hamster cells were exposed to ^{125}I radiation over a range of dose-rates. The fraction of cells surviving after 60 days was calculated for a population exposed to an initial dose-rate of 7.7 cGy/hr; this corresponds to a total dose of 160 Gy, or 80 Gy in the first half-life of the isotope. In the absence of any cell division, the degree of cell depopulation amounts to 10^{-10}. 19 references, 4 figures.

31760 (DOE/ER/60142—1, pp 178-184) **3-nitro triazole as a hypoxic cell sensitizer.** Astor, M.B.; Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

For radiosensitization a compound showing minimal neurotoxicity would be advantageous since it could be used at higher concentrations. Towards this end the triazole (1-methyl-3-nitro-1,2,4 triazole 3-NTR) was developed. Preliminary test of 3-NTR is reported here. The data show that 3-NTR is a very efficient radiosensitizer, specific for hypoxic cells, needing approximately one-half the concentration of misonidazole to obtain an equal enhancement ratio. Furthermore, 3-NTR at the highest dose tested, exhibited no significant toxicity towards either aerated or hypoxic cells. 10 references, 3 figures.

31761 (DOE/ER/60142—1, pp 224-238) **Charged-particle fluence and cellular morphometric inter-relations for linear energy transfer effects on progression through the cell cycle.** Geard, C.R. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Microdosimetric analysis of radiobiological phenomena have led to divergent views as to the interaction between macromolecules of biological importance. While the definition of physical parameters has proceeded, little attention has been given to the microdistribution of the macro molecules to even allow for some interpretations. In this study the nuclear cross-sectional area of cells growing in monolayer as a function of position in the cell cycle has been assessed. In conjunction with charged particle irradiations at known fluences ad controlled LET's, particle fluence per nucleus has been related to radiation-induced delays in cell cycle progression. While there is both a dose and LET dependent effect, it is apparent that given the nature of the variation of nuclear areas further interpretation is speculative. Inactivation cross-sections increase with LET, however it not known how this area is distributed through the nuclei nor the nature of the distribution. It is possible that the nuclei membrane is a target of interest. 16 references, 4 figures, 1 table.

31762 (DOE/ER/60142—1, pp 300-311) **Acid extracellular environment inhibits the fixation of radiation damage.** Freeman, M.L.; Sierra, E. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

This study illustrates that an acidic, extracellular environment after irradiation inhibits the fixation of radiation damage. The protective effect is not transient. The half time for fixation of acid modified damage is 7 min while the halftime for its repair is 10 min. These values are similar to those obtained when cells are held at 5°C, 20°C, or in anisotonic salt solutions after irradiation. 23 references, 4 figures, 2 tables.

31763 (DOE/ER/60142—1, pp 312-327) **Repair of sublethal damage in diploid human fibroblasts: a comparison between human and rodent cell lines.** Freeman, M.L.; Sierra, E.; Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

The repair of sublethal damage has been compared in the human cell lines GM-498 and GM 3440 with that which occurs in the rodent lines CHO and V-79. The data suggests that the human cell lines repair sublethal damage at least as well as the rodent cell lines. Another object of this investigation was to determine if the repair of sublethal damage can be observed in the initial region of the survival curve. While repair of sublethal damage can be observed in the second decade, it cannot be observed in the first, assuming no redistribution in the cell cycle. 12 references, 6 figures.

31764 (DOE/ER/60142—1, pp 328-346) **Radiobiological aspects of encapsulated sources of iodine-125; RBE and PLDR.** Marchese, M.J.; Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Studies with I-125, or similar x-rays, show a range of REB's of 1.0 to 2.0, with most values in the 1.2 to 1.5 range. We describe our results for the RBE of I-125 vs. Cs-137 at low dose rates using C_3H cells in plateau phase. 31 references, 4 figures, 2 tables.

31765 **(DOE/ER/60155—1) Atomic bomb survivor data: utilization and analysis.** Prentice, R.L.; Thompson, D.J. (eds.). (SIAM Inst. for Mathematics and Society, Philadelphia, PA (USA)). 1984. Contract FG02-83ER60155. 289p. (CONF-8309148—). NTIS, PC A13/MF A01; 1; GPO Dep. Order Number DE84010592.

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

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There were several motivations for organizing the SIMS Conference reported in this monograph. Risk assessment and its methods have been subjects of several SIMS Conferences in the recent past, and focusing these newer, more powerful methods on the largest human experience of exposure to ionizing radiation seemed an appropriate sequel. There was also the conviction that the data resources of the Radiation Effects Research Foundation (RERF), generated through the mortality and medical follow-up of large samples of the survivors of the atomic bombs dropped on Hiroshima and Nagasaki, were being under utilized, and that a conference and its proceedings would create interest in exploiting this resource. The time seemed ripe for gathering a small group of current RERF scientists, veteran US statisticians and epidemiologists, and others with more recent entry into the field of radiation biology to consider long range plans for maximizing the output of information not only on the long term effects of ionizing radiation on man but on new knowledge of the determinants of health and disease that can be learned by study of the records of this cohort. This seemed particularly appropriate at this time while intensive joint Japanese-US efforts are underway to provide a new, more accurate dosimetry for use in these studies. Finally, there was a hope that an ad hoc forum of this type would provide not only a summary of current statistical and epidemiologic activities at RERF, but a useful critique of their scope and quality.

31766 (DOE/ER/60155—1, pp 3-17) **Data resources for life span study.** Kato, Hiroo. (Radiation Effects Research Foundation (RERF), Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

The Life Span Study sample consists originally of 82,000 A-bomb survivors who were enumerated from a nation-wide A-bomb survivors survey conducted in 1950 and 27,000 non-exposed individuals. Mortality ascertainment is essentially complete by periodic checks against Koseki, but its weakness is the inexactness of the cause of death stated on the death certificate. Some of the latter can be compensated for by collateral use of autopsy information and the data from Tissue and Tumor Registries. Updating of the Hiroshima Tumor Registry has been recently completed and no serious bias related to radiation dose was observed in the data collection for either Hiroshima or Nagasaki. Also the completeness of registration is the highest among registries in Japan. The Tumor and Tissue Registries should be very useful data resources to determine the radiation effects on non-fatal cancers i.e., thyroid and

breast cancers as well as the fatal types. Lack of information on the out-migrated subjects from the two cities should be seriously considered, especially those who were of young age at the time of the bombing. Information on environmental factors other than radiation exposure, such as occupation, smoking and diet, has been collected by interviewers, mail questionnaires or record linkage with census data, since 1960. Such information is also currently obtained on a case-control basis for certain sites of cancer, such as breast, lung, colon and rectum, in this cohort. 11 references, 6 tables.

31767 (DOE/ER/60155—1, pp 18-31) **Data resources for the major cohort studies: the Adult Health Study.** Hamilton, H.B. (Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

The Adult Health Study (AHS), a program of biennial medical surveillance of the atomic bomb survivors of Hiroshima and Nagasaki, conducted in the Clinics of the Radiation Effects Research Foundation in the two cities, comprised, in 1958, when the study began, some 20,000 individuals, about half of whom were within 2000 meters of the hypocenters in 1945 at the time of the bomb, the remaining half being either beyond 3000 meters or not in the city at that time. The program, now in its 13th cycle of examinations, was preceded by a number of earlier studies of various exposed and control populations, which, by the mid 1950s were considered to be inadequately defined and therefore not suitable for long-term epidemiological investigations of the late medical and biological effects of exposure among the survivors in the two cities. Although the AHS has yielded considerable data relating to radiation exposure (carcinomas, other somatic effects), it also is an invaluable and unique epidemiological resource for the study of health and disease in a well defined closed population. 37 references, 4 figures.

31768 (DOE/ER/60155—1, pp 35-50) **Cancer mortality and incidence in the life span study: statistical methods used in reports five through ten.** Preston, D.L. (Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

The data on cancer incidence and mortality in the Radiation Effects Research Foundation (RERF) Life Span Study (LSS) are a major source of information on the long-term effects of radiation exposure on people. Various statistical methods used in the recent major analyses of these data are reviewed. In addition, the methods used in the current analysis of mortality and cancer incidence in the LSS through 1982 (LSS Report Ten) are outlined. 35 references, 2 figures, 1 table.

31769 (DOE/ER/60155—1, pp 51-66) **Hazard function modelling for dose-response analysis of cancer incidence in the A-bomb survivor data.** Pierce, D.A.; Preston, D.L. (Oregon State Univ., Corvallis; Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

General discussion is given regarding use of survival analysis methods for analysis of cancer incidence in the A-bomb survivor cohort. Both proportional hazards models and more general approaches are considered, using both distribution-free and fully parametric modelling. Some comparison is made to methods heavily relied upon in previous analyses, which do not explicitly model temporal variation in risks. It is pointed out that there is a strong connection between such methods and use of proportional hazards models. An example is given based on published data on mortality from all cancers except leukemia. 12 references, 2 figures, 1 table.

31770 (DOE/ER/60155—1, pp 67-80) **Modelling age- and time-dependent changes in the rates of radiation-induced cancers.** Darby, S.C. (Natinal Radiological Protection Board, Chilton, Didcot, Oxon, England). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

Generalized linear modelling procedures have been used to study the rates of radiation-induced cancer mortality among atomic bomb survivors with doses of at least 100 rads and patients with ankylosing spondylitis given x-ray therapy. Changes in the relative risk with age at exposure, time since exposure and age at observation have been modelled and compared. There was good agreement between the two data sets and no inconsistencies were found. For a group of solid tumors selected from sites that were heavily irradiated in the spondylitis series, relative risk decreased with age at exposure but did not vary with time since exposure between about 5 and at least 30 years following exposure. For leukemia relative risk decreased with time since exposure and, for atomic bomb survivors, the inclusion of those aged under 15 at exposure caused a significant decrease in relative risk with increasing age at exposure. Diagnoses from the leukemia registry were used to study mortality from acute leukemia in atomic bomb survivors. Age at observation was a useful variable in describing the pattern of acute leukemia risk. 18 references, 2 figures, 1 table.

31771 (DOE/ER/60155—1, pp 81-94) **Studies of cancer incidence in the life-span study sample: example of breast cancer.** Land, C.E.; Tokunaga, Masayoshi. (National Cancer Inst., Bethesda, MD; Kagoshima Univ., Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

It seems increasingly likely that it will be possible in the future to supplement the periodic death-certificate analyses of mortality in the Life-Span Study sample by site-specific studies of cancer incidence. The advantages of studying cancer risk in the LSS sample at the level of incidenc rather than mortality include better diagnostic accuracy and the ability to base inferences on risk data not obtainable from death certificates. There are, however, problems of underascertainment bias not present in the death-certificate studies which require special adjustments. The problems and opportunities are illustrated using a current study of breast cancer incidence. 16 references, 7 tables.

31772 (DOE/ER/60155—1, pp 99-111) **Radiation-induced chromosome aberrations in A-bomb survivors: a key to biological dosimetry.** Awa, A.A. (Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

This report describes the mechanism by which radiation-induced chromosome aberrations are formed. Somatic chromosome analysis data are presented on cultured peripheral lymphocytes from A-bomb survivors in the AHS cohort of Hiroshima and Nagasaki at RERF. Increase in the frequency of cells with chromosome aberrations was noted in relation to increasing radiation doses in both cities. However, there was a difference in the dose-response curves between the two cities when the comparison was made using the T65D system; being consistently higher in Hiroshima than in Nagasaki for all dose ranges. Recent preliminary reanalysis with newly proposed A-bomb dosimetry systems of ORNL and LLNL indicated that the degree of inter-city difference in chromosome aberration frequencies seemed to become considerably smaller than that using T65D. The discussion is extended to the usefulness of lymphocyte chromosome aberrations as an indicator for biological dosimetry applicable even to A-bomb survivors nearly four decades after radiation exposure. 15 references, 6 figues, 2 tables.

31773 (DOE/ER/60155—1, pp 112-126) **Statistical methods in various special studies at RERF.** Otake, Masanori. (Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

Various statistical methods have been employed for special studies of the relationship of radiation dose to endpoints described by Awa in these proceedings. This report illustrates several of these, raises a number of related, currently unresolved, problems, and describes the plan of a new study of chromosomal aberrations designed to overcome some of the problems alluded to. 12 references, 5 tables.

31774 (DOE/ER/60155—1, pp 127-139) **Regression methods for count data with extra-binomial variation.** Ochi, Y.; Prentice, R.L. (Univ. of Washington, Seattle; Fred Hutchinson Cancer Research Center, Seattle, WA). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

Statistical methods to analyze RERF chromosome aberration data are discussed. These data involve strong extra-binomial variation and appropriate methods to examine dose (radiation) response relationships are required. The use of a correlated probit regression model has potential for such a purpose and, in addition, possesses a natural interpretation. Methods for parameter estimation in this model are under development, as described herein. An illustration of the use of the correlated probit model is given. Other alternative procedures are also briefly discussed. 22 references, 3 tables.

31775 (DOE/ER/60155—1, pp 143-152) **Characteristics of current and expected dosimetry.** Jablon, S. (National Academy of Sciences, Washington, DC). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—). Contract AC01-76EV03161.

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

Inadequate attention has been given in the past to possible problems arising from errors in radiation doses assigned to A-bomb survivors in Hiroshima and Nagasaki. Dosimetry errors are of two kinds: systematic errors which result from mistaken values for such characteristics as bomb yield or atmospheric attenuation of radiation and individual errors which result from false location of survivors at the time of the bombing, nature of shielding or the like. Recent studies have demonstrated substantial systematic errors in the T-65 dosimetry system which has been used by RERF for analyses of radiation effects upon the health of the survivors during the decades after the bombings. The dosimetry system is now under review and every element is being subjected to reanalysis. It appears probable that in the revised dosimetry system which is now being created the curves which represent the gamma ray and neutron doses in air as functions of distance from the hypocenters will depart considerably from those of the T-65 system. Nevertheless, the estimates of cancer risk per rad are likely to change only by a factor of about two, in part because not all changes are in the same direction and in part because the estimates of risk are dominated by the experience of survivors whose doses (T-65) exceeded 100 rads, for whom the changes in gamma ray doses will be smallest. 5 references, 2 figures, 2 tables.

31776 (DOE/ER/60155—1, pp 153-169) **Use of cancer mortality data in Hiroshima and Nagasaki to assess various aspects of the radiation dosimetry.** Peterson, A.V. Jr. (Univ. of Washington, Seattle; Fred Hutchinson Cancer Research Center, Seattle, WA). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

Reported is the use of cancer mortality data on Hiroshima and Nagasaki A-bomb survivors to investigate two different aspects of the radiation dosimetry: the possibility of a circular asymmetry of radiation dose, and the possibility of a differential bias in radiation dosimetry between Hiroshima and Nagasaki. Results are summarized, and implications and suggestions for future work are indicated in three areas: (1) the use of mortality endpoint data to help to validate the revised dosimetry, (2) future analyses of radiation risk using the cancer mortality data, and (3) possible additional emphases in the current dosimetry reassessment. 31 references, 2 tables.

31777 (DOE/ER/60155—1, pp 183-193) **Potential additional data sources for dosimetry and biological re-evaluation.** Fujita, Shoichiro. (Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

A major reassessment of the A-bomb radiation dosimetry is currently under way, involving the joint efforts of radiation physicists in both Japan and the United States. Reported here are some of the data sources available at the Radiation Effects Research Foundation (RERF) which may be useful for deriving better estimates of the radiation doses received by the A-bomb survivors. Also reported are estimates of the changes in radiation dose-effect relationships occasioned by the adoption of Oak Ridge National Laboratory (ORNL) or Lawrence Livermore National Laboratory (LLNL) revised estimates of dose, using the interim revised doses currently available. 18 references, 3 figures, 2 tables.

31778 (DOE/ER/60155—1, pp 197-218) **Utilization of the Adult Health Study data: resources and methods of past and current analyses.** Kopecky, K.J. (Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

This report describes methods of analysis and reporting of data from the Adult Health Study (AHS). After some cautions concerning the data itself, the statistical methods of two comprehensive AHS reports are described. The analyses of several recent and more elaborate studies of cardiovascular and cerebrovascular disease are also described. An extension of a Monte Carlo procedure for estimating the significance of trends in and differences of rates is introduced. This paper ends with some suggestions for further use of the AHS data. 34 references, 1 figure, 2 tables.

31779 (DOE/ER/60155—1, pp 219-234) **RERF cohort studies: aspects of data analysis and resource utilization.** Prentice, R.L. (Fred Hutchinson Cancer Research Center, Seattle, WA; Univ. of Washington, Seattle). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

The potential of Radiation Effects Research Foundation (RERF) cohort studies to contribute to the general body of knowledge on disease risk factors is noted. For example, the Adult Health Study can provide the basis for a range of analyses on risk factor levels and more specifically, changes in risk factor levels, in relation to disease incidence. Similarly, the Life Span Study may be used to jointly examine radiation and standard epidemiologic risk factors in relation to cancer mortality. Relative risk regression methods are presented as a unifying approach to such cohort data analysis problems, robustness features are described and illustrations are given. Some potential uses of RERF cohorts involve extensive supplementary data collection or expensive synthesis of existing resources. In such circumstances a case-control sampling structure may usefully be imposed on the cohort. Some aspects of the design of a (synthetic) case-control study are described in the context of possible uses of RERF stored serum samples to relate blood levels of micronutrients to subsequent cancer incidence. The application of relative risk regression models in the presence of case-control sampling is also described. 21 references, 3 tables.

31780 (DOE/ER/60155—1, pp 235-248) **Ionizing radiation and lung cancer: a review including preliminary results from a case-control study among A-bomb survivors.** Blot, W.J.; Akiba, Suminori; Kato, Hiroo. (National Cancer Inst., Bethesda, MD; Radiation Effects Research Foundation, Hiroshima, Japan). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

Existing evidence clearly implicates ionizing radiation as a cause of human lung cancer. The effect is most apparent following prolonged exposure to radon among underground miners, but increases in risk also result from single or short term cu ulative exposures to high levels of radiation from medical sources and the atomic bombs. This paper reviews epidemiologic studies of radiation exposed groups, and presents preliminary data from a case-control study of lung cancer in Hiroshima and Nagasaki. The findings suggest that atomic radiation and smoking combine in an additive manner to increase lung cancer risk, in contrast to the multiplicative synergism between alpha-radiation from radon and smoking reported among uranium miners. 32 references, 6 tables.

31781 (DOE/ER/60155—1, pp 251-273) **RERF research agenda for studies of radiation-induced cancer.** Beebe, G.W. (National Cancer Inst., Bethesda, MD). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

In the last decade or so the numbers of cancers attributable to radiation among the Japanese A-bomb survivors have become large enough to permit quantitative estimates of risk and to encourage quantitative investigation of the many factors other than dose that appear to govern the appearance of radiation-induced cancer. The size and demographic complexity of the A-bomb survivor population are such that future studies should go far to provide the descriptive information on which our understanding of radiation carcinogenesis in man must ultimately depend. 60 references.

31782 (DOE/ER/60155—1, pp 274-279) **Some comments on the resources at RERF.** Moolgavkar, S.H. (Fox Chase Cancer Center, Philadelphia, PA). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

The stored sera at RERF are a valuable resource for seroepidemiology. There are increasing demands on this resource which should be used to address questions of importance to human health. This resource should be available to any investigator with an interesting idea. Of course, the real problem will be setting priorities. How should priorities be set. The setting up of a committee to review all proposals for use of the sera is strongly urged. 15 references.

31783 (DOE/ER/60155—1, pp 280-289) **Analysis of atomic-bomb survivor data: ongoing research and opportunities for the future.** Upton, A.C. (New York Univ. Medical Center, NY). 1984. NTIS, PC A13/MF A01. Order Number TI84010592. (CONF-8309148—).

From SIMS conference on atomic bomb survivor data - utilization and analysis; Alta, UT, USA (12 Sep 1983).

Study of the atomic bomb survivors has provided uniquely valuable information about the types of effects that are produced by ionizing radiation and their relation to dose, age at exposure, time after irradiation, and other variables. There are still, however, many unresolved questions requiring further investigation. These include reassessment of the dosimetry in both Hiroshima and Nagasaki; continued follow-up of survivors for cancer and other late effects, especially those who were exposed early in life and are just now reaching the age when the common cancers of adult life make their appearance; further evaluation of the possibility of measuring genetic effects in the children of survivors; and continued longitudinal investigation of risk factors predisposing to cancer, preneoplastic lesions, and other diseases. To the extent that a strong statistical foundation is essential to such investigations, the high calibre and sophistication of ongoing statistical research at RERF augers well for the future. 30 references, 4 figures.

31784 **(INIS-mf—8033) Decree No. 73-138 of 12 February 1973 in implementation of the Act of 1 August 1905 on repression of fraud concerning chemical products in human foodstuffs and articles in contact with food and beverages for human and animal consumption, as well as processes and products used for cleaning such articles.** (French Government, Paris). 15 Feb 1973. 3p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84780210.

Published in the French Official Gazette.

For purposes of health protection, this Decree prescribes detailed conditions governing trade in foods and beverages containing chemical products for human and animal consumption, including irradiated food. (NEA).

31785 **(INIS-mf—8695) Fourth scientific practical conference of the roentgenologists, radiologists and radiobiologists from North Bulgaria. Abstracts.** (Ministerstvo na Narodnoto Zdrave, Sofia (Bulgaria)). 1983. 145p. (CONF-8306167—Absts.). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84780122.

From 4. scientific practical conference of the roentgenologists, radiologists and radiobiologists from North Bulgaria; Gabrovo, Buulgaria (4 Jun 1983).

Individual items in scope for the data base are processed separately.

31786 **(INIS-mf—8724) Model theory studies on cell damaging and repair in X-ray experiments.** Dick, G. (Koeln Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 18 Dec 1982. 133p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84780278.

The author presents a theory to explain certain findings of radiobiology. The theory is based on a population model. The concept "class of damage" is introduced in order to describe the behaviour of populations. Every individual in a population belongs to a single class of damage at a given moment. Every treatment is represented in the population model by a single N matrix showing the changes of class possibly induced by the treatment. The number of N matrices permissible for the description of treatments is limited by axiomas. (orig./AJ).

31787 (INIS-mf—8966, pp vp) **Radiation and public health - fact vs. myth.** Borsa, Joseph (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). 1982. NTIS (US Sales Only), PC A15/MF A01. Order Number TI84780360. (CONF-8204158—).

From Nuclear information seminar; Calgary, Alberta, Canada (7 Apr 1982).

The author discusses current understanding of radiation hazards from all sources, the sources of this information, and the risks from CANDU-type reactors. The controversy about low-level radiation, and the probability and significance of error in risk estimates are also examined. He concludes that radiation has always been with all living beings, and that nuclear technology adds only a small fraction of a millirem per year. The public must decide if the risk is worth the benefits.

31788 **(JINR—E-19-83-156) Acute skin reaction after fractionated irradiation.** Kozubek, S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1983. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701712.

Experimental data on acute mouse and pig skin reaction after fractionated γ or X irradiation have been analysed in terms of a new cell tissue kinetic model. The exponential-quadratic and generalized Huggett formulae have been used for cell lethality description. Fairly better results could be demonstrated with generalized Huggett formula. The speed of repopulation has been determined for fractionated regimes as well as for some irregular schedules. The repopulation is slower in the case of fractionated treatment. On

considering the normal cell loss factor in the tissue, minimum cell cycle time has been calculated. Its value differs for various strains (Tsub(d)=28.8 hours for SAS/TO mice and Tsub(d) < or approximately 17 hours for WHT/Ht mice) and does not differ for plucked skin. The repopulation has been shown to follow exponential dependence after some latent period. Other factors influencing the effectiveness of radiation treatment (the length of the latent period or the changes of the survival curve during fractionated irradiation) have been considered, too.

31789 **(LBL—16793) Mechanisms of radiation-induced neoplastic cell transformation.** Yang, T.C.H.; Tobias, C.A. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 36p. (CONF-8307122—1). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012310.

From Neyman-Kiefer conference; Berkeley, CA, USA (1 Jul 1983).

Portions are illegible in microfiche products.

Studies with cultured mammalian cells demonstrated clearly that radiation can transform cells directly and can enhance the cell transformation by oncogenic DNA viruses. In general, high-LET heavy-ion radiation can be more effective than X and gamma rays in inducing neoplastic cell transformation. Various experimental results indicate that radiation-induced DNA damage, most likely double-strand breaks, is important for both the initiation of cell transformation and for the enhancement of viral transformation. Some of the transformation and enhancement lesions can be repaired properly in the cell, and the amount of irrepairable lesions produced by a given dose depends on the quality of radiation. An inhibition of repair processes with chemical agents can increase the transformation frequency of cells exposed to radiation and/or oncogenic viruses, suggesting that repair mechanisms may play an important role in the radiation transformation. The progression of radiation-transformed cells appears to be a long and complicated process that can be modulated by some nonmutagenic chemical agents, e.g., DMSO. Normal cells can inhibit the expression of transforming properties of tumorigenic cells through an as yet unknown mechanism. The progression and expression of transformation may involve some epigenetic changes in the irradiated cells. 38 references, 15 figures, 1 table.

31790 **(LBL—17431) Some important issues in developing basic radiation protection recommendations: dosimetric aspects.** Thomas, R.H. (Lawrence Berkeley Lab., CA (USA)). Mar 1984. Contract AC03-76SF00098. 71p. (CONF-840461—1). NTIS, PC A04/MF A01; GPO Dep. Order Number DE84012740.

From 20. annual meeting of the National Council on Radiation Protection and Measurements; Washington, DC, USA (4 Apr 1984).

Some aspects of the difficulties encountered in the dose equivalent system used in radiation protection are explored and recent work to improve these deficiencies described. The philosophical advantages of a departure from the dose equivalent-based system and its replacement by a risk-based system are briefly discussed. The definition of dose equivalent and the debate concerning its physical dimensions and units are described. Dose equivalent is related to other physiological quantities in physics and the treatment of these quantities in the International System of Units compared. Practical problems in the determination of dose equivalent are illustrated using neutrons as an example. The proliferation of operational quantities for the evaluation of neutron dose equivalent and the concomitant potential for confusion when determinations of neutron dose equivalent are intercompared is described. The evaluation of fluence to dose equivalent conversion coefficients and methods of interpolation between recommended values are described. Particular emphasis is given to the accuracy and precision of dose equivalent estimation. Recent work of a Task Group of the ICRP to improve recommended conversion coefficients and the work of an ICRU committee to improve the definition of operational dose equivalent quantities is summarized. 125 references, 11 figures, 4 tables.

31791 **(NRPB-R—41) Study of chromosome aberration yield in human lymphocytes as an indicator of radiation dose. VI. A review of cases investigated, 1975.** Purrott, R.J.; Lloyd, D.C.; Prosser, J.S.; Dolphin, G.W.; Tipper, P.A.; Reeder, E.J.; White, C.M.; Cooper, S.J.; Stephenson, B.D. (National Radiological Protection Board, Harwell (UK)). Jan 1976. 14p. HMSO, National Radiological Protection Board, Harwell, Didcot, England. Order Number TI84901059.

Results from cytogenetic investigations into 37 cases of suspected overexposure to radiation during 1975 are reviewed. This report is the fifth in an annual series which together contain data on 206 studies. Results from all 206 investigations have been pooled for general analysis. Brief accounts are given in an appendix of the circumstances behind the past year's 37 investigations and where possible physical estimates of dose have been included for comparison. A short review is given of recently completed experiments to determine the effects of dose rate and dose fractionation on the aberration yield, and the importance of these variables for chromosome dosimetry is discussed. A brief outline is also given of those aspects of the current research program which are aimed at improving the techniques of cytogenetic dosimetry. 14 references, 4 tables.

31792 **Variance and regression analyses of Moyer model parameter data and their variation with primary proton energy.** Kuei-Lin, L.; Stevenson, G.R.; Thomas, R.H.; Thomas, S.V. (Univ. of California, Berkeley). *Health Physics;* **46**: No. 3, 674-681(Mar 1984). Contract AC03-76SF00098.

The Moyer model parameter, H_0, is a function of the primary proton energy. The statistical analysis of the empirically determined values of H_0, both by analysis of variance and by regression analysis is described here. This note describes the application of Fisher's F-test to the hypothesis that the experimental data are linearly related (both untransformed and in log-log transformation), as well as tests various hypotheses relating the Moyer parameter, H_0, with primary proton energy E/sub p/ and discusses the need for more experimental data. Finally, it is suggested that the techniques of statistical analysis described here may be usefully applied in the future as more experimental data are accumulated.

31793 **Protracted exposure to fallout: the Rongelap and Utirik experience.** Lessard, E.T.; Miltenberger, R.P.; Cohn, S.H.; Musolino, S.V.; Conard, R.A. (Brookhaven National Lab., Upton, NY). *Health Physics;* **46**: No. 3, 511-527(Mar 1984). Contract AC02-76CH00016.

From June 1946 to August 1958, the U.S. Department of Defense and the U.S. Atomic Energy Commission (AEC) conducted nuclear weapons tests in the Northern Marshall Islands. On 1 March 1954, BRAVO, an above-ground test in the Castle series, produced high levels of radioactive material, some of which subsequently fell on Rongelap and Utirik Atolls due to an unexpected wind shift. On 3 March 1954, the inhabitants of these atolls were moved out of the affected area. They later returned to Utirik in June 1954 and to Rongelap in June 1957. Comprehensive environmental and personnel radiological monitoring programs were initiated in the mid 1950s by Brookhaven National Laboratory to ensure that body burdens of the exposed Marshallese subjects remained within AEC guidelines. Their body-burden histories and calculated activity ingestion rate patterns post-return are presented along with estimates of internal committed effective dose equivalents. External exposure data are also included. In addition, relationships between body burden or urine-activity concentration and declining continuous intake were developed.

31794 **Calculation of total transformations in organs following the inhalation of radioactive aerosols of different sizes.** Maillie, H.D. (Univ. of Rochester School of Medicine and Dentistry, NY). *Health Physics;* **46**: No. 3, 587-597(Mar 1984). Contract AC02-76EV03490.

A technique is presented which makes use of the ICRP methodology for calculating the total number of transformations in an organ following the inhalation of radioactive aerosols of various half-lives and activity median aerodynamic diameters (AMADs).

As found in studies involving respiratory and gastrointestinal tract activities under similar conditions, there are constants common to the aerosol class which allow the plotting of factors which depend only upon the radioactive half-life of the isotopes involved. The method shows the influence of respiratory uptake on the total number of tranformations in the organ as well as the influence of AMAD and the route the isotope takes to the organ, e.g. directly from the respiratory tract or via the gastrointestinal tract. Although the technique is more complicated than that used for the respiratory or gastrointestinal tract uptake, the method requires a minimum of calculation.

31795 **Tritium distribution and excretion following intratracheal instillation of glass microballoon fragments in rats.** Cool, D.A.; Maillie, H.D. (Univ. of Rochester School of Medicine and Dentistry, NY). *Health Physics;* **46**: No. 3, 599-606(Mar 1984). Contract AC02-76EV03490.

The distribution and time course for tritium activity in Sprague-Dawley rats exposed to tritiated glass fragments by intratracheal instillation have been defined. Particles were deposited primarily in the pulmonary region, allowing for the measurement of long-term tritium dissolution and particle movement. The tritium activity of the body water and tissues was found to follow a three-compartment model where tritiated glass fragments provide a continuous input to the body water, and tritium was removed from the body according to the classical elimination pattern for HTO. The dissolution of tritium in vivo was found to be biphasic. The glass fragments were removed from the pulmonary region slowly. The resultant dose to the lung was three orders of magnitude greater than the dose to the body, and approx. 40 times greater than the dose incurred in the lung from the inhalation of a similar quantity of HTO.

31796 **Concentration of orally administered and chronically fed /sup 95m/Tc in Japanese quail eggs.** Thomas, J.M.; Cadwell, L.L.; Cataldo, D.A.; Garland, T.R.; Wildung, R.E. (Battelle Pacific Northwest Lab., Richland, WA). *Health Physics;* **46**: No. 3, 657-663(Mar 1984). Contract AC06-76RL01830.

A chronic feeding study using /sup 95m/Tc incorporated into alfalfa and an acute study where /sup 95m/Tc was amended to alfalfa showed that about 8.4% of ingested Tc was transferred to eggs. After 10 days of chronic feeding, 80% of the Tc was in yolk, 20% in albumin and less than 1% in shell and associated membranes. The biological half-time for Tc was about one to two days in acute studies. Results from the chronic feeding study also indicated that Tc levels in albumin reach a maximum between three and five days while maximum yolk concentration is attained in about six to seven days. Albumin concentration declined about 20-50% after Day 6.

5602 Thermal Effects

REFER ALSO TO CITATION(S) 31813, 31814

31797 **(PB—84-145812) Environmental effects of cooling-water discharge into the ocean.** Grange, K.R. (New Zealand Energy Research and Development Committee, Auckland). Sep 1983. 17p. (R—96). NTIS, PC A02/MF A01.

This report outlines the biological effects that may be caused by heated effluent from thermal power stations using seawater for cooling. Overseas literature on case studies is summarised with emphasis on predicting possible problems in New Zealand and how to minimize possible effects. Ecological surveys and monitoring studies undertaken in Manukau Harbour as baseline research for Auckland Thermal No. 1 and the subsequent combined-cycle power station sites are outlined, and recommendations for the design of future power stations in New Zealand attempted from the results of this research.

5603 Chemicals Metabolism And Toxicity

REFER ALSO TO CITATION(S) 30123, 30124, 30126, 30128, 30129, 30130, 30238, 30274, 31657, 31686, 31727

31798 **(ANL—82-65-Pt.3, pp 1-4) Rains experiment: Part II.** Irving, P.M.; Kristofzski, J. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

A dose-response experiment was performed with radish plants placed beneath the spray nozzle to simulated acid rain. In addition to measuring the yield response, the investigators determined photosynthetic rates just prior to harvest. 1 reference, 3 figures.

31799 **(ANL—82-65-Pt.3, pp 5-8) Effect of the sulfate-to-nitrate ratio on the response of radish to simulated rain acidity.** Irving, P.M.; Kestner, A. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

Radish was studied to determine whether the ratio of SO_4^{-2} to NO_3^- in acid rain affects the response of a root crop. Simulated acid rain with a pH of 3.0 was used. Plants were sprayed with simulated rain beginning on the sixth day after planting and continuing three times a week for a total of ten rain events. Plants were harvested on the 28th day after planting, and the weights of above- and below-ground portions were determined. 2 references, 2 figures, 1 table.

31800 **(ANL—82-65-Pt.3, pp 9-14) Experimental field facility for long-term studies of acidic deposition effects on plant/soil systems.** Irving, P.M.; Miller, J.E.; Prepejchal, W.; Hoff, J.; Segers, J. 1982. NTIS, PC A05/MF A01. Order Number TI84001670.

In Radiological and Environmental Research Division: ecology. Annual report, January-December 1982.

A field microcosm facility with two reconstructed soil systems was designed for the purpose of conducting long-term, controlled field investigations of acid-rain impacts. Soils were selected for the facility on the basis of their agronomic importance in the Midwest and their potential sensitivity to acidic deposition. A loam-LaHogue, a mixed mesic Aquic Argiudoll - and a sandy loam - Alvin, a mixed mesic Typic Hapludalf - were reproduced, by horizon, in the microcosms. Determinations of pH, cation-exchange capacity, and neutralization potential suggest that the Alvin soil may be more sensitive to acid-rain effects than the LaHogue. However, measurements of sulfur levels in the soil and soil water indicate that the Alvin soil has a much higher sulfate absorption capacity and thus may be less susceptible to cation leaching and acidification from sulfate mobility. 1 reference, 4 figures.

31801 **(CNAEM-R—215) Investigation of biokinetics of cadmium in the mussel in various environmental conditions.** Erdener, B. (Cekmece Nuclear Research and Training Center, Istanbul (Turkey)). 1982. 65p. (In Turkish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701714.

The biokinetics of cadmium were investigated under different environmental conditions in mussel (M. galloprovincialis) using sup(^{115}m)Cd as tracer. The accumulation experiment was followed from water for 34 days and observed concentration factor 68 was obtained. On the other hand, it is observed that between the concentrations used in the experiment, the accumulation increased proportionally with the stable cadmium concentration in water. During depuration, more than one compartment has been observed on the loss curves carried out under different temperature and salinity. The results showed that mussels under 22-1°C lost cadmium more rapidly at the beginning compared with the ones under 15-1°C, which were kept in the same salinity, 0.21%. At the same time, the loss rates were found significantly different under different salinities. For example, the biological half-lives were 407.6 and 866.2 at the salinities 0.21% and 0.7% S respectively. The loss rate of cadmium was also followed under field condition. It is concluded that the results obtained in the field and the laboratory cannot be com-

parable; for example, the biological half-lives for the slow components in these two experiments were 350 and 612 days respectively. The relative distribution of cadmium in different organs and tissues are examined, it is observed that cadmium both after accumulation and loss periods, is localized in stomach hepatopancreas, gills and mantle. At the end of the accumulation experiment the highest relative percentage of cadmium was 30% in stomach, 22.7% in hepatopancreas. Likely at the end of loss periods the highest percentages of retained cadmium were 42% in stomach and 32% in hepatopancreas.

31802 (DOE/ER/60142—1, pp 156-167) **Role of thyroid hormone in the induction of neoplastic transformation by chemical carcinogens.** Borek, C.; Ong, A. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Our results indicate that thyroid hormone plays a key role in chemically induced transformation in cell systems of two species without modifying the survival and growth of these cells. The presence of the hormone is a prerequisite for induction of transformation. It's action appears to be in the early steps of neoplastic transformation, in initiation and fixation of the events rather than in later phases associated with expression and promotion. Maximum effect on transformation rate was exerted when T_3 was added to the medium 12 hours prior to B(a)P treatment. T_3 was less effective in modulating transformation when added at the time of B(a)P exposure and was ineffective if added post B(a)P treatment. 5 references, 1 figure, 4 tables.

31803 (DOE/ER/60142—1, pp 185-223) **Intracellular thiols: involvement in drug metabolism and radiation response.** Astor, M. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Nitro compunds are activated by coupled enzyme reactions to oxygen reactive intermediates leading to the formation of peroxide, under aerobic conditions, and to the depletion of thiols, under anaerobic conditions. Some nitro compounds as substrates for glutathione-S-transferase, show peroxide production without prior thiol removal. Other drugs reacting spontaneouly with glutathione also produce peroxide. Glutathione plays an important role in the metabolism of the nitrocompounds either by directly reacting with them or their reduced intermediates such as the nitroso, nitro and hydroxyl radical. In the case of misonidazole, protection against their cytotoxic effects can be achieved by the addition of exogenous thiols such as glutathione or cysteamine. Results indicate that oxygen and peroxide electrodes provide convenient means for measuring the products of metabolic activation of nitro compounds. Mechanisms are proposed whereby protein, nonprotein and glutathione thiols can interact with drug radicals or with DNA radicals. 60 references, 14 figures, 5 tables.

31804 (DOE/ER/60142—1, pp 251-261) **Lens epithelium: an in vivo-vitro model system for the study of potential cataractogens and clastogens.** Geard, C.R. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

The consequences of exposing rat lens epithelial cells maintained as lens organ cultures to different doses of mitomycin C and to Cs^{137} gamma rays are related. It was found that bromodeoxyuridine can be satisfactorily applied to cytokinetic studies of the vertebrate lens. Treatment of the lens by either mitomycin C or gamma rays was found to induce perturbations in the cell cycle of lens epithelial cells. In organ culture the lens shows a positive clastogenic response to both agents and can be used to monitor for potential mutagen-carcinogens. 4 tables.

31805 (DOE/ER/60142—1, pp 262-282) **Chemosensitization in vitro: on the mechanism of the preincubation effect of hypoxic cell sensitizers.** Roizin-Towle, L. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

These studies indicate that the interaction of sensitizer and chemotherapeutic agent is most effective when given in close sequence. Recovery from misonidazole toxicity is essentially complete by 4 hours when split dose exposures are performed with either Melphalan or cysteamine. Thiol regeneration during this recovery period varied depending upon the severity of its depletion under various post-treatment conditions. Thiol status may influence the cell's initial response to injury and its capacity to repair. Preincubation with hypoxic cell sensitizers may prove to be of value in killing hypoxic cells with chemotherapeutic agents. 33 references, 6 figures, 1 table.

31806 (DOE/ER/60142—1, pp 283-299) **Thiol depletion and enhanced melphalan toxicity by sensitizers and BSO.** Roizin-Towle, L.; Costello, T. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

Chemosensitization by drugs that deplete endogenous cell thiols by different mechanisms was the focus of this study. The enhancement of melphalan toxicity by preincubation exposure of cells with Misonidazole or SR-2508 was compared to that of cells pretreated with buthionine-SR-sulfoximine, a competitive inhibitor of glutamylcystein synthetase. 20 references, 6 figures.

31807 **(HRP—0904747/3) Single photon emission computerized tomography (SPECT).** Walker, B. (Health Planning Council for Greater Boston, Inc., MA (USA)). 3 Aug 1983. 20p. NTIS, PC A02/MF A01.

SPECT is a significant technological advancement in the development of nuclear medicine technology. Nuclear medicine is a diagnostic technology which looks at disease process. This diagnostic technology is considered key to therapeutic intervention because such intervention can take place before the disease causes often times irreversible tissue damage. SPECT improves upon conventional nuclear medicine technology by providing increased image contrast as well as improving upon the ability to look deeper into tissue structure.

31808 **(K/SUB—81-9039/3) Acute toxicity of the hydrolysis products of uranium hexafluoride (UF_6) when inhaled by the rat and guinea pig. Final report.** Leach, L.J.; Gelein, R.M.; Panner, B.J.; Yulie, C.L.; Cox, C.C.; Balys, M.M.; Rolchigo, P.M. (Rochester Univ., NY (USA). Medical Center). Apr 1984. Contract AC05-84OT21400. 129p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84011539.

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This report presents the experimental animal data base from which human health consequences may be predicted from exposures mimicing accidental discharges of uranium hexafluoride (UF_6) in the uranium industry. Rats or guinea pigs were exposed for two, five, or ten minutes duration to air having 0.44 g U/m^3 + 0.16 g HF/m^3 to 276.67 g U/m^3 + 94.07 g HF/m^3. Survivors of each exposure were observed for 14 days for signs of U or HF intoxication. Selected animals were necropsied and samples of major organs were studied histopathologically. When enriched UF_6 (94 percent ^{235}U) was used, the urine and feces from each animal were measured daily for U content. Selected samples of urine were bioassayed in order to trace the course of renal injury during the two week postexposure period. 28 references, 51 figures, 23 tables.

31809 **(NP—4770280) Forrest diseases.** (Hessischer Minister fuer Landesentwicklung, Umwelt, Landwirtschaft und Forsten, Wiesbaden (Germany, F.R.)). Dec 1983. 67p. (In German). (NP—4770280). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84770280.

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The Government of Hessen is actively participating in the struggle against forest diseases. Efficient counter-measures require courage and standing power as the resistance of the established interests shall be fierce. Therefore it is inevitable that the citizens must be broadly informed about forest diseases and their overall context. Such information is able to make the afflicted citizen an efficient ally in putting through the necessary environmental counter-measures.

31810 **(NP—4770322) Influence of lead on the immun defense against tumor cells: 'In vitro-experiment with the LMC-test'.** Gularek, M. (Duesseldorf Univ. (Germany, F.R.). Medizinische Fakultaet). 1981. 68p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84770322.

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The mice of C57BL/strain - female - were fed for three months with diet containing lead acetate (Altromin 1314, 4000 mg/kg). Within this period the level of lead in blood stabilized at 72sub(/)ug lead/100 ml blood. The immunological activity of the spleen cells was measured by microcytotoxic test in vitro against allogenic and syngeneic tumors. Both nonimmunized mice and immunized mice were tested. The immunocytes from lead treated mice compared with the cells from unexposed control showed significantly higher cell mediated cytotoxicity under all experimental conditions.

31811 **(PB—84-148592) Protection against trichothecene mycotoxins. Final report.** (National Academy of Sciences - National Research Council, Washington, DC (USA)). 1983. 240p. NTIS, PC A11/MF A01.

Library of Congress catalog card No. 83-62917.

Trichothecene mycotoxins, produced by certain fungi found in cereal grains, are a significant health problem in agricultural settings and have been detected throughout the world. Concern about the reported use of trichothecenes in chemical warfare agents, or 'yellow rain,' led the U.S. Army to request that the National Research Council form a committee on protection against mycotoxins, to study the effects of trichothecenes on civilians and military personnel who might be exposed to high levels of these substances. The report discusses scientific questions about the natural occurrences of mycotoxins, methods of detection and quantitation, decontamination and detoxification, long-term environmental effects, effects on humans and animals, and strategies for prevention and treatment. It also recommends areas of research that are particularly promising. An extensive bibliography is included.

31812 **(PB—84-150051) Health hazard evaluation report No. HETA 80-234-1196, Master Metals, Incorporated, Cleveland, Ohio.** Boiano, J.M.; Moody, P.L. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Sep 1982. 36p. NTIS, PC A03/MF A01.

Health complaints consisted of digestive disturbances, constipation, and headaches. On September 25-26, 1980, and May 6-7, 1981, NIOSH investigators conducted an environmental and medical evaluation of the production workers. Further medical testing was conducted on October 20-22, 1981. Environmental measurements were made to determine worker exposure to lead, arsenic, arsine, stibine, and sulfur dioxide. The medical evaluation consisted of blood lead determinations, confidential questionnaires, blood pressure measurements, and blood and urine tests of kidney and erythropoietic function. A serious health hazard of overexposure to airborne lead and arsenic existed. A high prevalence of anemia and kidney function abnormalities suggests long-standing, severe lead toxicity among workers.

31813 **(PB—84-150549) Avoidance responses of estuarine fish subjected to heated chlorinated and dechlorinated power plant effluents.** (Johns Hopkins Univ., Laurel, MD (USA). Applied Physics Lab.). Dec 1983. 57p. NTIS, PC A04/MF A01.

The avoidance responses of striped bass (Morone saxatilis) and Atlantic menhaden (Brevoortia tyrannus) exposed to simultaneous total residual chlorine (TRC) and dechlorinated conditions were evaluated at acclimation temperatures of 15, 20, 25 and 30C.

31814 **(PNL-SA—11833) Effects of suspended volcanic ash and thermal shock on susceptibility of juvenile salmonids to disease.** Poston, T.M.; Neitzel, D.A.; Abernethy, C.S.; Carlile, D.W. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76RL01830. 34p. (CONF-8404156—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011873.

From 8. symposium on aquatic toxicology; Ft. Mitchell, KY, USA (15 Apr 1984).

Susceptibility of salmonids to the fish pathogen Flexibacter columnaris was used to assess sublethal stress following exposures to two environmental stressors, thermal shock and suspended volcanic ash. Juvenile rainbow trout (Salmo gairdneri) were more susceptible to disease following exposure to 0.3 g/L and 11.5 g/L suspended volcanic ash. The response was dose-dependent. Exposure of juvenile chinook salmon (Oncorhynchus tshawytacha) to thermal shock did not result in increased susceptibility to disease. In several tests, thermally exposed fish were less susceptible to disease than control fish. 21 references, 8 figures, 3 tables.

31815 **Metabolic models for methyl and inorganic mercury.** Bernard, S.R.; Purdue, P. (Oak Ridge National Lab., TN). *Health Physics;* **46**: No. 3, 695-699(Mar 1984). Contract W-7405-ENG-26.

Following the outbreak of mercury poisoning in Minimata, Japan (1953-60), much work has been done on the toxicology of mercury - in particular methyl mercury. In this paper, the authors derive two compartmental models for the metabolism of methyl mercury and inorganic mercury based upon the data which have been collected since 1960.

31816 **Health risks from light-duty diesel vehicles.** Cuddihy, R.G.; Griffith, W.C.; McClellan, R.O. (Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM). *Environmental Science and Technology;* **18**: No. 1, 14A-21A(Jan 1984). Contract AC04-76EV01013.

Because concentrations of particles from diesel vehicles will not exceed about 40 $\mu g/m^3$, even in very congested urban areas, they should not by themselves cause symptoms of respiratory disease. However, combined with particle emissions from other sources, diesel vehicles could contribute substantially to the total particulate pollution levels in urban areas. In consequence, ambient levels in these areas may then exceed air quality standards and cause a concomittant rise in respiratory disorders. Lung cancer risks from inhaling diesel exhaust particles were estimated by comparing their carcinogenic potencies with other substances that have been shown to cause cancer in humans. It was estimated that the expected levels of exposure in congested urban areas could increase a person's lung cancer risk by a few percent, but that the overwhelming cause of lung cancer in a population will continue to be cigarette smoking. Overall, diesel-powered vehicles are expected to cause less than about 200 lung cancers per year in the U.S. population. However, the information currently available is insufficient to exclude the possibility that no lung cancer cases can be attributed to the emission from light-duty diesel vehicles.

5604 Other Environmental Pollutant Effects

REFER ALSO TO CITATION(S) 31138

31817 (DOE/ER/60142—1, pp 239-250) **Nuclear magnetic resonance and ionizing radiation: a comparative evaluation in vitro of oncogenic and genotoxic potential.** Geard, C.R.; Osmak, R.S.; Hall, E.J. Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

In this study the mouse C3H 10T1/2 system is utilized to evaluate both the carcinogenic and genotoxic potential of NMR versus ionizing radiation. Experiments were designed to examine possible effects on transformation induction, on the induction of chromosomal aberrations and sister chromatid exchanges, as well as on induced cellular lethality and alterations in cellular kinetics. An ionizing radiation dose of about 0.3 Gy was chosen as a possible maximum to which a human is likely to be exposed as a consequence of a radiological examination procedure, while for the NMR comparison, cells were simultaneously exposed to a magnetic field (2 Telsa), teo 3 pulsed lower strength field gradients and to pulsed radiofrequency wave excitation. Exposure times were intended as far in excess of what might be expected from diagnostic procedures. 17 references, 3 tables.

31818 **(LBL—17542) Experimental studies relating environmental lighting and flicker to visual fatigue in VDT operators.** Berman, S.M.; Greenhouse, D.S.; Bailey, I.L.; Bradley, A. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 15p. (CONF-8304176—1; EEB-L—83-11). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012573.

From 3. international symposium on the science and technology of light sources; Toulouse, France (18 Apr 1983).

An operator of a visual display terminal is typically confronted with two flickering light sources, the VDT phosphor with its inherent refresh rate, and the ambient fluorescent illumination which is reflected from the screen. The two sources of flicker can produce low frequency beats in the net light intensity presented to the VDT operator. These low frequencies, on the order of a few Hertz, can potentially lead to adaptation of visual sensory mechanisms. We have constructed an experiment in which a stable beat frequency is produced, thus enhancing the possibility of detecting a visual system response. By adjusting the environmental lighting to produce a sinusoidal flicker at 69 Hz, and employing a VDT with a 61 Hz refresh rate, we have produced an 8 Hz beat frequency in the light emanating from the VDT screen. By measuring temporal contrast sensitivity at 8 Hz as an assay of sensory visual system response, we have determined that two of three subjects show a reduced sensitivity when exposed to this stimulus, as compared with three sets of control conditions in which the 8 Hz beat is not present. 6 references, 1 figure, 1 table.

31819 **(PB—84-149798) Annual report of the Division of Risk Assessment (formerly Division of Biological Effects) National Center for Devices and Radiological Health, fiscal year 1982, October 1, 1981-September 30, 1982.** (National Center for Devices and Radiological Health, Rockville, MD (USA)). Sep 1983. 77p. NTIS, PC A05/MF A01.

See also PB83-165779.

The Division of Risk Assessment (formerly the Division of Biological Effects) plans, conducts, and supports epidemiologic and experimental research on the biological effects of exposure to electromagnetic radiation, magnetic fields, and acoustic energy with special emphasis on emission from electronic products. This report covers activities that were in progress during Fiscal Year 1982.

31820 **(PB—84-150457) Health hazard evaluation report No. HETA 82-080-1153, WCMH-TV, Columbus, Ohio.** Boxer, P.A.; Boiano, J.M. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Aug 1982. 20p. NTIS, PC A02/MF A01.

On December 14, 1981, NIOSH received a request to investigate a possible increased incidence of cancer among employees at WCMH-TV, and possible radiation hazards at the broadcasting station. A list of all deceased former employees of WCMH-TV was obtained, and relevant information was abstracted from available personnel records. NIOSH conducted a survey for radiofrequency/microwave (RF/MW) non-ionizing radiation and X-ray ionizing radiation on February 17, 1982. Based on the radiation measurements, NIOSH investigators concluded that workers operating or in the vicinity of the various types of electronic equipment at WCMH-TV were not exposed to a RF/MW or X-radiation hazard. Limited information did not allow verification of cause of death in approximately half the cases, making it impossible to determine if the rate of cancer among employees at the broadcasting station was higher than expected.

57 HEALTH AND SAFETY

REFER ALSO TO CITATION(S) 30238, 31659, 31713

31821 **(PB—84-145473) Walk-thru survey report: Manville Products Corporation/Manville at Lompoc, California.** Cooper, T.C. (National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)). Sep 1982. 10p. (CT—112.23A). NTIS, PC A02/MF A01.

The Manville Products Corporation (SIC-3295) in Lompoc, California, was surveyed on August 6, 1982 to determine its suitability for an indepth study of engineering control technologies. Specifically, the packaging operation which bagged diatomaceous earth products was studied. A total of 375 hourly and 95 salaried employees worked at the facility. Observations included engineering controls, work practices, and personal protective equipment. Exhaust ventilation was provided at each manual bag filling station. There was a capture hood around each packer spout and a hood with exhaust ventilation around each packer unit. Inside and near the top of each press well, there were slots for exhaust ventilation designed to capture airborne dust generated during pallet loading.

31822 **(PB—84-149202) Heat resistant protective clothing.** Smissaert, L. (Centre Scientifique et Technique de l'Industrie Textile Belge (CENTEXBEL), Brussels). 1983. 27p. (In French). NTIS, PC E04/MF E04.

This report begins by reviewing the recent published literature on protective clothing made from high performance fabrics, with particular reference to comparative test methods. A method used by Centexbel for testing the performance of clothing against convective heat, based upon ASTM-D 11-77-4, is described in detail. Interpretation of test results is discussed in relation to heat resistance factors calculated by Stoll and Chianta.

31823 **(USGS-OFR—83-157) Workshop on continuing actions to reduce losses from earthquakes in the Mississippi Valley area.** Gori, P.L.; Hays, W.W. (eds.). (Geological Survey, Reston, VA (USA)). 1983. 158p. (CONF-8205262—). US Geological Survey, National Center-MS 905, Reston, VA 22092. Order Number TI84901254.

From Workshop on continuing actions to reduce losses from earthquakes in the Mississippi Valley area; St. Louis, MO, USA (24 May 1982).

The purpose of the workshop was to improve the transfer and application of research results dealing with the earthquake threat in the eastern United States. Action plans identifying steps that can be taken immediately to reduce losses from earthquakes in each of the seven states in the Mississippi Valley area were developed. Earthquake hazards in the Mississippi Valley were discussed, as well as federal planning efforts and recommendations to achieve earthquake hazard reduction measures. (ACR)

58 GEOSCIENCES

5801 Geology And Hydrology

REFER ALSO TO CITATION(S) 30190, 30312, 30313, 30314, 30315, 30316, 30362, 31698

31824 **(ANL/ES—134-Pt.1) Geology, hydrology, and mineral resources of crystalline rock areas of the Lake Superior region, United States. Part 1.** Harrison, W.; Edgar, D.; Van Luik, A.; Hinze, W.; Braile, L.; Kalliokoski, J.; Pfannkuch, H.; Wright, H. Jr.; Tisue, M.; Sood, M. (Argonne National Lab., IL (USA)). Oct 1983. Contract W-31-109-ENG-38. 407p. NTIS, PC A18/MF A01; 1; GPO Dep. Order Number DE84012682.

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This report, which includes a series of maps, is a compendium of the available information on several topics of importance in defining the geologic setting of crystalline rocks in the Lake Superior region (Minnesota, Wisconsin, and the Upper Peninsula of Michigan). Crystalline rocks are defined herein as bodies of medium; and coarse-grained igneous and high-grade metamorphic rocks. The study was undertaken to provide background information to assist in evaluating the suitability of such rocks for isolating high-level radioactive waste. Topics covered include geologic history of the region; patterns of earthquake occurrence, earthquake magnitudes and horizontal ground accelerations, crustal stress, regional fault domains, and Holocene faulting and vertical crustal movements; surface processes, anticipated climatic changes, and effects of renewed glaciation; landforms and surficial deposits; regional surface; and ground-water hydrology; and commercial potential of rock and mineral prospects of mines located within or near crystalline rock bodies. References, 117 figures, 36 tables.

31825 **(ANL/ES—134-Pt.2) Geology, hydrology, and mineral resources of crystalline rock areas of the Lake Superior Region, United States.** Harrison, W.; Edgar, D.; Van Luik, A.; Hinze, W.; Braile, L.; Kalliokoski, J.; Pfannkuch, H.; Wright, H. Jr.; Tisue, M.; Sood, M. (Argonne National Lab., IL (USA)). Oct 1983. Contract W-31-109-ENG-38. 87p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012683.

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This report is a compendium of the available information on several topics of importance in defining the geologic setting of crystalline rocks in the Lake Superior region (Minnesota, Wisconsin, and the Upper Peninsula of Michigan). Crystalline rocks are defined herein as bodies of medium- and coarse-grained igneous and high-grade metamorphic rocks. The study was undertaken to provide background information to assist in evaluating the suitability of such rocks for isolating high-level radioactive waste. Volume 2 contains a series of maps: a geologic map of the Lake Superior region, a seismic map of the Lake Superior region, and maps showing the distribution of crystalline rock bodies in Wisconsin, Michigan, and Minnesota.

31826 **(ANL/ES—136-Pt.1) Geology, hydrology, and mineral resources of crystalline rock areas of the northeastern United States.** Harrison, W.; Edgar, D.; Barosh, P.; Ebel, J.; Kuecher, G.; Tisue, M.; Tsai, S.; Winters, M.; Flower, M.; Sood, M. (Argonne National Lab., IL (USA)). Oct 1983. Contract W-31-109-ENG-38. 387p. NTIS, PC A17/MF A01; 1; GPO Dep. Order Number DE84013672.

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This report, which includes a series of maps, is a compendium of the available information on several topics of importance in defining the geologic setting of crystalline rocks in Maine, New Hampshire, Vermont, northeastern New York (the Adirondack Mountains), Massachusetts, Rhode Island, Connecticut, southeastern New York, northern New Jersey, and southeastern Pennsylvania. Crystalline rocks are defined herein as bodies of medium- to coarse-grained igneous and high-grade metamorphic rocks. The study was undertaken to provide background information to assist in evaluating the geologic suitability of such rocks for isolating high-level radioactive waste. Topics covered include the geologic history of the region; patterns of earthquake occurrence, earthquake magnitudes and horizontal ground accelerations, crustal stress, regional fault domains, and Holocene faulting and vertical crustal movements; surface processes, anticipated climatic changes, and possible effects of renewed glaciation; landforms and surficial deposits; regional surface-water and ground-water hydrology; and the commercial potential of rock and mineral prospects and mines located within or near crystalline-rock complexes. 68 figures, 35 tables.

31827 **(ANL/ES—136-Pt.2) Geology, hydrology, and mineral resources of crystalline rock areas of the northeastern United States. Part 2.** Harrison, W.; Edgar, D.; Barosh, P.; Ebel, J.; Kuecher, G.; Tisue, M.; Tsai, S.; Winters, M.; Flower, M.; Sood, M. (Argonne National Lab., IL (USA)). Oct 1983. Contract W-31-109-ENG-38. 103p. NTIS, PC A06/MF A01; GPO Dep. Order Number DE84013671.

This report is a compendium of the available information on several topics of importance in defining the geologic setting of crystalline rocks in Maine, New Hampshire, Vermont, northeastern New York (the Adirondack Mountains), Massachusetts, Rhode Island, Connecticut, southeastern New York, northern New Jersey, and southeastern Pennsylvania. Crystalline rocks are defined herein as bodies of medium- to coarse-grained igneous and high-grade metamorphic rocks. The study was undertaken to provide background information to assist in evaluating the geologic suitability of such rocks for isolating high-level radioactive waste. Part 2 contains a series of maps showing the distribution of described crystalline rock bodies of the northeastern United States.

31828 **(GSCan-P—81-23, pp 139-143) Influence of a metamorphosed gabbro in the control of uranium-bearing pegmatite dykes, Madawaska Mines, Bancroft, Ontario.** Bedell, R.L. (Toronto Univ., Ontario (Canada). Dept. of Geology). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

A study was undertaken to examine the structure in the vicinity of Madawaska Mines as a controlling factor for the uranium-bearing pegmatitic granites and syenites that constitute the orebodies. These relatively undeformed rocks are confined to the deformed anorthositic Faraday metagabbro complex. This paper examines firstly the strain distribution within the Faraday metagabbro complex in order to predict paths of least resistance along which the younger pegmatites were emplaced. Secondly, certain geochemical properties of the metagabbro host rock that may have had an influence on the formation of the ore deposits are described.

31829 **(LA-UR—84-1662) Prehistoric variability of metal and $^{13}C/^{12}C$ content in bone: dietary and gender factors.** Bumsted, M.P.; Boutton, T.W.; Barnes, R.M.; Armelagos, G.J. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 27p. (CONF-8308175—1). NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012457.

From 11. international congress of anthropological and ethnological sciences; Vancouver, Canada (21 Aug 1983).

The Wolf Creek population from the Middle Missouri region was analyzed to determine if $\delta\ ^{13}C$ and elemental composition will vary in a population, and what the nature of the variation is. It was concluded that: (1) $\delta\ ^{13}C$ composition is different between remnant bone protein and soft tissues; (2) $\delta\ ^{13}C$ varies between interior Amerindian populations primarily because of the presence or absence of maize horticulture; and (3) $\delta\ ^{13}C$ clusters by sex in a C_4 population. 43 references, 11 figures. (ACR)

31830 **(LA-UR—84-1663) Forum introduction, forum on stable isotopic and metals composition, nutrition, and human adaptation.** Bumsted, M.P. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 12p. (CONF-8308175—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012584.

From 11. international congress of anthropological and ethnological sciences; Vancouver, Canada (21 Aug 1983).

This introduction discusses the theme of the forum, which was nutritional studies approached through analytical and nuclear chemistry of archaeological samples. (ACR)

31831 **(NP—4901040) Utilization of snow enhancement techniques for acquisition of geological and geo-environmental information from ERTS imagery.** Wobber, F.J.; Martin, K.R. (Earth Satellite Corp., Washington, DC (USA)). Aug 1974. 34p. NTIS, PC A03/MF A01. Order Number DE84901040.

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The Manual describes the use of snow cover as an enhancement medium for geological analysis of ERTS imagery. Conditions of snow cover which accentuate geological and geo-environmental phenomena are described. Viewing techniques and ERTS MSS band format useful for satisfying practical geological information requirements are described. 9 references, 9 figures, 5 tables.

5802 Geophysics

REFER ALSO TO CITATION(S) 30187, 30361, 31823, 31824, 31825, 31826

31832 **(NUREG/CR—3805) Engineering characterization of ground motion. Task I. Effects of characteristics of free-field motion on structural response.** Kennedy, R.P.; Short, S.A.; Merz, K.L.; Tokarz, F.J.; Idriss, I.M.; Power, M.S.; Sadigh, K. (Structural Mechanics Associates, Inc., Newport Beach, CA (USA); Woodward-Clyde Consultants, Walnut Creek, CA (USA)). May 1984. 381p. NTIS, PC A17/MF A01 - GPO* $8.50. Order Number DE84901344.

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This report presents the results of the first task of a two-task study on the engineering characterization of earthquake ground motion for nuclear power plant design. The overall objective of this study is to develop recommendations for methods for selecting design response spectra or acceleration time histories to be used to characterize motion at the foundation level of nuclear power plants. Task I of the study develops a basis for selecting design response spectra, taking into account the characteristics of free-field ground motion found to be significant in causing structural damage.

31833 **(PB—84-148790) Geophysical fluid dynamics laboratory activities - FY83, plans - FY84.** (National Oceanic and Atmospheric Administration, Princeton, NJ (USA). Geophysical Fluid Dynamics Lab.). Sep 1983. 154p. NTIS, PC A08/MF A01.

See also PB83-232827.

This document is intended to serve as a summary of the work accomplished at the Geophysical Fluid Dynamics Labortory (GFDL) and to present a glimpse of the near future direction of its research plans. The overview covers the four major research areas that correspond to NOAA's mission in oceanography and meteorology: Weather Observation and Prediction; Climate; Air Quality; and Marine environmental quality. The body of the text describes goals, specific recent achievements and future plans for the following major research categories: Climate Dynamics; Middle Atmosphere Dynamics and Chemistry; Experimental Prediction; Oceanic Circulation; Planetary Circulations; Observational Studies; Hurricane Dynamics; Mesoscale Dynamics; Convection and Turbulence.

31834 **(UCRL—90710) Utility of regional Chinese seismograms for source and path studies in central Asia.** Patton, H.J.; Taylor, S.R.; Harris, D.B.; Mills, J.M. Jr. (Lawrence Livermore National Lab., CA (USA)). Apr 1984. Contract W-7405-ENG-48. 20p. (CONF-8405186—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012610.

From Defense Advanced Research Projects Agency/Air Force Office of Scientific Research program review; Santa Fe, NM, USA (6 May 1984).

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Regional surface waves recorded at the Urumchi station located about 700 km north of the Tibetan Plateau in the Sinkiang Province are used to study East Kazakh explosions and wave propagation in central Asia. The data consist of broadband (flat to displacement between 0.1 and 10 Hz), photographic records from an SK Kirnos galvanometric system. Simultaneous inversion of Rayleigh wave phase and group velocities for the path from East Kazakh through the Dzhungarian Basin yields a crustal model dominated by the presence of very low velocities and a strong positive velocity gradient above 15 km depth. Velocities below 15 km depth are not significantly different from other continental structures underlain by Paleozoic or Precambrian basement. This model is consistent with geologic evidence indicating that most of the path is characterized by the presence of up to 10 km of sediments overlying a Paleozoic basement. Source studies were made on seven East Kazakh explosions detonated in the time period between June 1980 and April 1981. These studies involved estimation of seismic moments using models of explosion sources with associated tectonic release. The largest explosion studied occurred on 9/14/80 and had an m/sub b/ of 6.2 and a seismic moment of 2.7 x 10^{23} dyn-cm. The observed amplitude spectra of Rayleigh waves are richer in high frequencies than predicted by explosion source models with tectonic release. This could be caused by a path effect involving seismic wave focusing by the large sedimentary basin between East Kazakh and the Urumchi station, although source medium effects cannot be ruled out. 30 references, 5 figures, 2 tables.

31835 **(USGS-OFR—83-14) Catalog of earthquakes in southern Alaska, April-June 1980.** Fogleman, K.A.; Stephens, C.D.; Lahr, J.C.; Roger, J.A.; Cancilla, R.S.; Tam, R.; Freiberg, J.A.; Melnick, J.P. (Geological Survey, Menlo Park, CA (USA)). 1983. 56p. USGS-OFS, Box 25425 Denver Federal Center, Denver, CO 80225. Order Number TI84901200.

This earthquake catalog presents origin times, focal coordinates and magnitudes for 1302 shocks occurring in the second quarter of 1980. Readings from a total of 65 stations were used to locate the shocks, including 12 stations operated by the NOAA Alaska Tsunami Warning Center (ATWC, formerly Palmer Observatory), 6 stations operated by the Geophysical Institute of the University of Alaska (U. of A.), and 4 stations operated in southwest Yukon Territory by the Department of Energy, Mines and Resources, Canada. The shocks included in this catalog are as small as magnitude 1.0 and most are smaller than magnitude 3.0. 19 references, 9 figures, 1 table.

31836 **(USGS-OFR—83-68) Eruptive history of the Dieng mountains region, central Java, and potential hazards from future eruptions.** Miller, C.D.; Sukhyar, R.; Santoso; Hamidi, S. (Geological Survey, Denver, CO (USA)). 1983. 22p. USGS-OFS, Box 25425-Denver Federal Center, Denver, CO 80225. Order Number TI84901188.

The Dieng Mountains region consists of a complex of late Quaternary to recent volcanic stratocones, parasitic vents, and explosion craters. Six age groups of volcanic centers, eruptive products, and explosion craters are recognized in the region based on their morphology, degree of dissection, stratigraphic relationships, and degree of weathering. These features range in age from tens of thousands of years to events that have occurred this century. No magmatic eruptions have occurred in the Dieng Mountains region for at least several thousand years; volcanic activity during this time interval has consisted of phreatic eruptions and non-explosive hydrothermal activity. If future volcanic events are similar to those of the last few thousand years, they will consist of phreatic eruptions, associated small hot mudflows, emission of suffocating gases, and hydrothermal activity. Future phreatic eruptions may follow, or accompany, periods of increased earthquake activity; the epicenters for the seismicity may suggest where eruptive activity will occur. Under such circumstances, the populace within several kilometers of a potential eruption site should be warned of a possible eruption, given instructions about what to do in the event of an eruption, or temporarily evacuated to a safer location. 6 references, 6 figures, 2 tables.

31837 **(USGS-OFR—83-82) Examples of the use of geologic and seismologic information for earthquake-hazard reduction in southern California.** Kockelman, W.J. (Geological Survey, Denver, CO (USA)). 1983. 59p. USGS-OFS, Box 25425-Denver Federal Center, Denver, CO 80225. Order Number TI84901198.

The report illustrates some of the range and types of applications of geologic and seismologic information used by planners and decisionmakers to reduce earthquake hazards in Southern California. Included among the users are State legislators, State agencies, county planning commissioners, county board supervisors, mayors, councilpersons, engineers, building inspectors, and real-estate sellers. The examples affect on entire State, a metropolitan region, a 2740 square-mile (7097 km^2) county, a city of almost 3 million people, and individual lots and acreages offered for sale. Each example contains a summary of the problems or needs faced by the users, the Earth-science information used or available, the specific action taken, the methods and procedures used to carry out each action, and brief comments on the impact of each plan or decision and its adaptation for earthquake-hazard reduction by other users. 72 references, 12 figures.

5803 Mineralogy, Petrology, And Rock Mechanics

REFER ALSO TO CITATION(S) 30357, 30371, 30384, 31845, 31847, 31851, 31855

31838 (GSCan-P—81-23, pp 37-47) **Characteristics of the Okanagan highlands intrusive complex as a source for basalt-type uranium deposits, south-central British Columbia.** Boyle, D.R. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Sedimentary hosted uranium deposits in the Okanagan region of British Columbia occur in unconsolidated, carbonaceous-rich, late Miocene fluvial channel sediments overlying Tertiary

fault zones within the Okanagan Highlands Instrusive Complex. The complex consists of Cretaceous quartz monzonite, granodiorite and related pegmatites and Eocene monzonite and related dyke rocks. The deposits, classed as 'basal type', are at the basement-sediment contact and are capped by Pliocene valley basalts. All of the mineralization discovered is in the form of uranous (ningyoite) or uranyl (saleeite, autunite) phosphates. The formation of these deposits is considered to be the result of structurally controlled, deep seated groundwater leaching of the basement complex with eventual infiltration into the fluvial channel sediments and precipitation of uranium phosphate minerals.

31839 (GSCan-P—81-23, pp 119-124) **Airborne radiometric anomalies caused by late kinematic granite rocks in the Molson Lake-Red Sucker Lake area, east-central Manitoba.** Weber, W.; Schledewitz, D.C.P.; Soonawala, N.M. (Manitoba Dept. of Energy and Mines, Winnipeg (Canada)). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Geological mapping with simultaneous ground gamma ray spectrometer surveys in an area with a chain of airborne radiometric anomalies of greater than 2 ppm eU indicate uranium enrichment in late kinematic pink leucogranitic rocks including granites, alaskites, and syenites which form dykes, stocks and small plutons in a batholithic tonalite - granodiorite complex. Field geolocial evidence suggests that the potassium-rich rocks were formed by hydrothermal solutions and that at least some of them are metasomatic replacement bodies. Results of geophysical grid survey over a pronounced anomaly indicate that it is caused by a significant volume of leucogranitic rocks with an unusually high background concentration of uranium averaging 25 ppm eU. The uranium seems to be associated with hematite which coats mineral grains and fills small fractures.

31840 (GSCan-P—81-23, pp 157-165) **Image processing of coincident binary patterns from geological and geophysical maps of mineralized areas.** Fabbri, A.G. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Binary images of different map units can be extracted, in registration with each other, from systematically digitized maps of an area. The images are transformed and combined with one another to define regional geological situations which are described by the resulting new sets of coincident patterns. Binary transformations provide quantitative measures of orientation and distributions of map units, and of interrelations between them. Fast parallel processing for producing the transformations can be obtained by compressing the binary data to one bit per pixel and by using both Boolean and bit shift operators, which are available on most computers. To exemplify the approach, these techniques are used in the study by minicomputer of selected geological information on two areas in the Canadian Shield being assessed for mineral resources. In one area patterns are extracted which are related to uranium occurrences; in the other area a relationship is derived between the orientation pattern of gravity anomaly contours and that of deep seated granitic intrusions.

31841 (GSCan-P—81-23, pp 167-168) **Some relationships between granitic plutons and the distribution of uranium deposits.** Ruzicka, V. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

31842 (GSCan-P—81-23, pp 169-170) **Signatures of metalliferous granites in the British Isles.** Plant, J.; Simpson, P.R. (Institute of Geological Sciences, London (UK)); Brown, G.C. (Open Univ. Milton Keynes (UK). Dept. of Earth Sciences). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

31843 **(INIS-mf—8717) Model calculations to formation of salt deposits.** Hunsche, U. (Technische Univ. Braunschweig (Germany, F.R.). Naturwissenschaftliche Fakultaet). 26 Nov 1976. 102p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780266.

The present work is a contribution from the geophysical side and its target is to explain the formation of long stretched salt deposits - salt walls - in a better manner than has been done sofar using model calculations. A few works have already been dedicated to this subject (they are treated in chapter 5). They all have the disadvantage however in not being able to represent the time sequence of the salt deposit generations. Precisely the latter is achieved in this work by including assumed initial interference. The values for the salt wall distance and its growth rate are improved upon. The Schleswig-Holstein salt deposit is taken as example. The model calculations are supported by model experiments.

5804 Geochemistry

REFER ALSO TO CITATION(S) 30345, 30365, 31838, 31839

31844 (GSCan-P—81-23, pp 19-30) **Mineralogical and petrochemical properties of heterogeneous granitoid rocks from radioactive occurrences in the Grenville structural province, Ontario and Quebec.** Rimsaite, J. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Granitoid rocks from radioactive occurrences in Grenville Structural Province locally reach ore grade uranium concentrations of more than 0.05 % U. This paper discusses properties of ore grade specimens from the operating Madawaska uranium mine and several closed mines in the Bancroft area, Ontario, and compares them with those from radioactive occurrences in Mont-Laurier and Baie-Johan-Beetz areas, Quebec. One property common to all the granitoid rocks studied here is their heterogeneity, represented by erratic distribution of U, Th and rare-earth elements; discordant U, Th, Pb isotopic ages; unusual hybrid petrographic characteristics of mineralized rocks; heterogeneous minerals in hybrid mineralized zones; and fracturing and associated diverse alterations. The heterogeneous nature of the host rocks, discordant isotopic Pb/U, Pb/Th and $^{207}Pb/^{206}Pb$ apparent ages and erratic variations of Pb/U and U/Th ratios in radioactive minerals reflect a complex geological history which resulted in modifications of U-Th-Pb systems in the areas studied.

31845 (GSCan-P—81-23, pp 31-36) **Uranium in alkaline intrusions, southeastern British Columbia.** Burwash, R.A.; Berndt, K.A. (Alberta Univ., Edmonton (Canada)). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Six small Coryell (Tertiary) stocks have been sampled along an 80 km profile trending southwestward across the strike of the eastern part of the Omineca Crystalline belt. The profile extends from Mt. McGregor, near Kootenay Lake, to Rossland. From field, petrographic and chemical data, all samples seem to belong to a single magmatic event. The rocks range from shonkinite to leucocratic biotite syenite, with biotite augite monzodiorite the dominant phase volumetrically. Quartz appears in the norms of only 2 of 50 analyzed samples. Olivine, fresh or pseudomorphed, appears in most thin sections. The inferred parental magma is an alkaline olivine basalt. U/Th values for the Coryell stocks are, on average, twice those of the Simpson Islands dyke, Northwest Territories, also of alkaline olivine basalt parentage. Along the Coryell profile, values of U/Th and K_2O/Na_2O decrease progressively from northeast to southwest. This decrease corresponds to a thinning of the sialic crust westward from the Purcell Arch. The U and K_2O

changes can be explained as a function of crustal assimilation, controlled by crustal thickness.

31846 (GSCan-P—81-23, pp 49-53) **Behaviour of U, Th and other trace elements during evolution of the Guichon Creek Batholith, British Columbia.** McMillan, W.J. (British Columbia Ministry of Energy, Mines and Petroleum Resources, Victoria (Canada)). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Island arc series granitic rocks exemplified by the calc-alkalic Guichon Creek batholith in south-central B.C. have primitive Sr isotopic ratios and mantle affinities. Uranium and thorium levels in these primitive intrusions tend to be very low. Differentiation trends during evolution of such intrusions tend to concentrate uranium and thorium into more acidic phases. However, if a fluid phase evolves, uranium and thorium are partitioned into it and the acidic phases become depleted in these elements.

31847 (GSCan-P—81-23, pp 55-59) **Geochemistry of granitoid plutons of Cape Breton Island, Nova Scotia.** Barr, S.M. (Acadia Univ., Wolfville, Nova Scotia (Canada). Dept. of Geology). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Granitoid plutonic rocks in ten areas of Cape Breton Island have been mapped and sampled for petrological studies. These plutons range in age from late Hadrynian to Carboniferous, and include four with known occurrences of Cu, Mo, and/or W mineralization. They range from diorite to leucogranite in composition, and show typical calc-alkalic chemical trends. With the exception of one muscovite-bearing S-type pluton, all show characteristics of I-type granitoid rocks. They generally do not show chemical features typical of specialized (Sn-U) granites. Mineralized phases are generally lower in SiO_2 compared to unmineralized rock types, and high background means and standard deviations in Ba, base metals, and S may be useful in recognizing mineralized rock types.

31848 (GSCan-P—81-23, pp 61-69) **Uraniferous granitoid rocks from the Superior province of Northwestern Ontario.** Breaks, F.W. (Ontario Geological Survey, Toronto (Canada)). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Recent regional examination of uranium-enriched coarse-grained to pegmatitic Archean granitoids in part of the Superior Province of northwestern Ontario has revealed a dichotomy of host lithologies for the mineralization. A provisional classification based upon petrological attributes, geological setting, and U/Pb ages documents Type I uraniferous mineralization derived from magmatization of an extensive metasedimentary belt at 2.68 Ga, and Type II mineralization associated with fractionation of a potassic granitoid suite emplaced at about 2.65 Ga. Type I uraniferous mineralization exhibits a patch of U-Th fractionation which trends subparallel to lines of average crustal estimates. Contrastingly, Type II mineralization generally exhibits distinctively different U-Th trends which ultimately manifest in very low Th/U ratios. In general, lower K/Rb, Ba/Rb, and higher K/Ba ratios are expressed by Type II uranium occurrences. One of the major controls on the less fractionated and lower grade Type I uranium mineralization is postulated to be lower fO_2 which may relate to the presence of graphite in a metapelitic precursor. Such conditions of reduced fO_2 are also reflected in the ubiquity of white K-feldspar in the S-type granitoids in contrast to the pink to red K-feldspar characterizing Type II uranium occurrences.

31849 (GSCan-P—81-23, pp 71-79) **Petrochemistry of the Blanchford Lake complex near Yellowknife, Northwest Territories.** Davidson, A. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Field studies in 1971 and 1978 outlined a relatively large, subcircular, high-level plutonic complex at the south edge of the Slave Province. Radioisotope analyses give ages of the order of 2150 Ma. Successive intrusive units range from gabbro (with anorthosite inclusions) through leucoferrodiorite, quartz syenite and granite to peralkaline granite and syenite. Nb and REE mineralization, along with high concentrations of Na, Zr, F and, locally, Y, Th and U, is associated with late pegmatite veining and alteration in the peralkaline rocks. This study documents progressive changes in major and minor element concentrations in the intrusive rocks. Differentiation by fractionation appears to have played a dominant role in the development of both the earlier aluminous and later peralkaline rocks. Chemical differences between these two suggest the possibility of different origins, but one unit, the Whiteman Lake Quartz Syenite, has some characteristics of both. High initial $^{87}Sr/^{86}Sr$ ratios in the peralkaline rocks can be as well explained in terms of a lengthy fractionation process as by crustal derivation or contamination of magma. Patterns of element depletion and enrichment throughout the differentiated suite are entirely consistent with the hypothesis that the observed alteration and mineralization are the end-products of magmatic differentiation.

31850 (GSCan-P—81-23, pp 81-90) **Comparative petrochemistry of two cogenetic monzonitic laccoliths and genesis of associated uraniferous actinolite-apatite-magnetite veins, east arm of Great Slave Lake, District of Mackenzie.** Gandhi, S.S.; Prasad, N. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Two cogenetic mazonitic laccoliths, one hosting uraniferous actinolite-apatite-magnetite veins, were sampled for a comparative petrochemical study as an aid to understanding the genesis of the veins and to provide guides for exploration of other similar intrusions in the east arm of Great Slave Lake. The results reveal that the two bodies are very similar in chemical and mineralogical composition. They show a small compositional range and a calc-alkaline differentiation trend. They are subalkaline in character but locally show effects of alkali metasomatism. Uranium and thorium contents of both intrusions average about 6 and 27 ppm respectively. Most of the variation in the contents of uranium and thorium occurs at local rather than regional level in each of the laccoliths and the variance between the laccoliths is negligible. Although the range and mean of uranium values in both laccoliths are similar, the laccolith barren of veins has the values showing a clustered distribution within the range in contrast to the laccolith hosting the veins, which shows a scattered distribution suggesting some uranium mobility.

31851 (GSCan-P—81-23, pp 91-99) **Radiometric study of three radioactive granites in the Canadian Shield: Elliot Lake, Ontario; Fort Smith, and Fury and Hecla, N.W.T.** Charbonneau, B.W. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Granitic rocks in three areas of the Canadian Shield have been studied with respect to their uranium and thorium contents. These rocks are all associated with various types of radioactive concentrations. The trends defined in the variations of uranium and thorium with their ratios reflect the amount or remobilization of uranium that has occurred within the plutons. An increase in the U/Th ratio indicates postmagmatic remobilization of U. A lack of variation indicates no such remobilization. An inverse correlation between U/Th ratio and Th indicates radioelement distributions that were at least partly governed by magmatic processes. The amount of postmagmatic remobilization that has taken place is indicative of favourability for epigenetic uranium mineralization within or near the intrusion. However, rocks that show a lack of remobilization may be important as a source of clastic mineralization provided that suitable accessory minerals are present. The relationships between radioelement concentrations and their ratios are detectable on airborne radiometric maps and profiles allowing the users some insight on the uranium potential of granitic terranes.

31852 (GSCan-P—81-23, pp 101-113) **Uraniferous granites and associated mineralization in the Fury and Hecla Strain area, Baffin Island, N.W.T.** Maurice, Y.T. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Two well-defined circular airborne radiometric anomalies were outlined in Archean and/or Lower Proterozoic basement rocks north of Fury and Hecla Strait in northern Baffin Island. Systematic mapping and rock analyses show that the main radioactive unit underlying both anomalies is a homogeneous calc-alkali granite averaging 8 ppm U and 80 ppm Th. A portion of the granite underlying the eastern anomaly averages 30 ppm U and 120 ppm Th and is heavily jointed with some fractures showing wall rock alteration and uranium concentrations up to 90 ppm. A process of removal of uranium from the granite mass and its concentration in zones of fractures is suggested to explain the origin of the radioactive veins as well as the more uraniferous parts of the eastern granite. It is not known whether this took place under supergene or hydrothermal conditions but the proximity of the veins to the unconformity and a relatively simple element assemblage favours a supergene origin. However, the presence of radioactive veins within the Upper Proterozoic sediments is indicative that at least some mineralization formed after deposition of the sediments.

31853 (GSCan-P—81-23, pp 115-118) **Anomally '60': a uraniferous granitic pluton on Melville Peninsula, N.W.T.** Delpierre, M.E. (Cominco, Ltd., Vancouver, B.C. (Canada)). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

The Proterozoic (Aphebian) Penrhyn Group in the Foxe Fold Belt in south-central Melville Peninsula, N.W.T. hosts numerous coarse-grained to pegmatitic granitic plutons, some of which show a definite enrichment in uranium with a few being significantly anomalous. Anomaly '60' is caused by a strongly radioactive pegmatitic granite intrusion that occurs at the base of the Penrhyn metasediments which rest unconformably on Archean gneisses. The granite is both discordant and concordant with the Proterozoic country rocks (marbles and paragneisses) and exhibits ghost layering at numerous localities. Uranium mineralization as uranophane and other secondary minerals sometimes forming pseudomorphs after uraninite appears to show a strong association with biotite accumulations. Thorium is variably present and may exceed the uranium content. Results from rock geochemistry, ground radiometry, detailed prospecting and a diamond drill program of six short holes conducted in 1979, indicate that although some ore grade mineralization occurs over short sections, the low grade and tonnage potential coupled with logistical difficulties, makes this 'porphyry uranium' occurrence uneconomic at present.

31854 (GSCan-P—81-23, pp 125-138) **Uraniferous pegmatites of the Sharlot Lake area, Ontario.** Ford, K.L. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

Reconnaissance airborne gamma ray spectrometric data covering the southern Grenville Province clearly indicate four anomalous zones, namely Mont Laurier and Huddersfield Township in western Quebec, and the Bancroft and Sharbot Lake areas in eastern Ontario. These surveys show that the Sharbot Lake area has a distinctly higher average eU/eTh ratio compared to the other Grenville pegmatite districts. Detailed surveys in the Sharbot Lake area have been particularly useful in providing a comprehensive picture of the pegmatite distribution. The majority of the pegmatites occur as conformable to semiconformable sill-like bodies ranging from bands less than 1 metre wide to bodies exceeding 500 by 50 metres. They are generally white to pale pink, massive to locally foliated and coarse grained. The principal radioactive mineral is uraninite commonly associated with biotite. Other radioactive phases include allanite, monazite, thorite, uranothorite, zircon and apatite. Average equivalent uranium concentrations measured by in situ gamma ray spectrometry range from a low of 3 ppm (averaging 36 ppm eTh) for pegmatites hosted by pink leucogranite gneiss to amphibolite-hosted pegmatite with an averge of 41 ppm (averaging 24 ppm eTh). Locally, equivalent uranium concentrations exceeding 5000 ppm may be found. Field evidence suggests that the pegmatites may have been developed by partial melting of Grenville Supergroup paragneisses. In places the pegmatites show evidence of mobilization and emplacement into adjacent granite gneisses and metasediments.

31855 (GSCan-P—81-23, pp 145-155) **Uranium mineralization and lithogeochemistry of the Surprise Lake batholith, Atlin, British Columbia.** Ballantyne, S.B.; Littlejohn, A.L. (Geological Survey of Canada, Ottawa, Ontario). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

The upper Cretaceous quartz monzonitic Surprise Lake Batholith, near Atlin in northwestern British Columbia, exhibits many chemical and petrological pecularities of 'specialized' granitoid intrusions. Surface rock and diamond drill core samples were examined to ascertain petrographical, mineralogical and lithogeochemical features which might explain its abnormally high radioelement and lithophile element concentrations. The results are developed into a model describing the metallogeny of uranium and base metal mineralization observed within the intrusion.

31856 (GSCan-P—81-23, pp 171-172) **Geochemistry and geology of some uraniferous granites in Labrador.** Kerswill, J.A. (Geological Survey of Canada, Ottawa, Ontario); McConnell, J.W. (Newfoundland Dept. of Mines and Energy, St. John's (Canada)). 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84701838. (CONF-8011208—).

From Uranium in granites workshop; Ottawa, Ontario, Canada (25 Nov 1980).

5805 Oceanography

REFER ALSO TO CITATION(S) 30226, 30351, 30352, 30354, 30355, 30543, 31833

31857 **(AD-A—136857/0) Coastal flooding and storm protection program; field verification program. Mathematical modeling of three-dimensional coastal currents and sediment dispersion: model development and application. Final report.** Sheng, Y.P. (Aeronautical Research Associates of Princeton, Inc., NJ (USA)). Sep 1983. 300p. NTIS, PC A13/MF A01.

A comprehensive model of Coastal currents and sediment dispersion has been formulated and applied to the Mississippi Sound and adjacent continental shelf waters. The study combines mathematical modeling of various hydrodynamic and sedimentary processes with laboratory and field experiments. Of primary importance is the development of an efficient and comprehensive three-dimensional, finite-difference model of coastal, estuarine, and lake currents (CELC3D). The model resolves currents driven by tide, wind, and density gradient. It has been applied to the Mississippi Sound, and results agree well with measured surface displacements and currents during two episodes. Rates of entrainment and deposition of the Mississippi Sound sediments have been studied in a laboratory flume. Effects of (1) bottom shear stress, (2) bed properties, (3) salinity of water, and (4) sediment type on the erodability of sediments have been examined. Results of the laboratory study have been incorporated into the bottom boundary conditions for a three-dimensional sediment dispersion model. Gravitational settling and particle size distribution of the Mississippi Sound sediments were also studied in laboratories. Bottom boundary layer dynamics and wave effect on sediment dispersion have been studied by means of a turbulent transport model and a wave model. Model simulations of sediment dispersion in the Mississippi Sound agree well available data from ship surveys.

31858 **(PB—84-141878) Geologic observations at the 2800-meter radioactive waste disposal site and associated deepwater dumpsite 106 (DWD-106) in the Atlantic Ocean. (Revised). Final report.** Rawson, M.D.; Ryan, W.B.F. (Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory). Sep 1983. 63p. NTIS, PC A04/MF A01.

During 1975 and 1976 a total of eight manned submersible dives with DSRV ALVIN were carried out in a relatively small region of the Atlantic 2800m radioactive waste dumpsite and were centered at 38 degrees 30'N and 72 degrees 09'W. Six other dives were distributed through the northern part of Deepwater Dumpsite 106 (DWD-106) near the boundary of the continental rise/continental slope. One of the primary purposes of these dives was to observe the geological conditions in this disposal region slightly south of the Hudson submarine Canyon. The lower continental slope was found to be incised by submarine canyons debouching into the northern side of DWD-106. The upper continental rise was incised by narrow meandering channels. One of these channels passed through the radioactive waste dumpsite and was surveyed in detail. On the upper continental rise the local terrain was relatively flat but studded with numerous tracks, trails, holes, and mounds of biological orgin. The sediment carpet was composed of a grapy silty-clay. Detailed mineralogical analysis was performed.

31859 **(PB—84-148196) Generation of mesoscale hydrodynamic phenomena by the Grappler and Whiting Seamounts, southeast of Puerto Rico. Master thesis.** Capella, J.E. (Center for Energy and Environment Research, Mayaguez (Puerto Rico)). 1983. 125p. NTIS, PC A06/MF A01.

This work presents the results of research on topographically generated mesoscale eddies in the region of the Grappler and Whiting Seamounts which are located 22km southeast of Puerto Rico. Three different data sets were used: (1) site specific hydrographic data, (2) satellite images from TIROS/NOAA, Landsat and Skylab satellites, and (3) free-drifting drogued-buoy tracks. A reference current meter station was established at the Benchmark B OTEC site at a depth of 20 meters. Predictions from numerical and analytical models were tested using the site specific data and then compared to experimental results. The hydrographic and drogue data definitively establish the presence of perturbations over the seamounts which are qualitatively consistent with model predictions. Closed contour regions in the distribution of dynamic heights, temperature, salinity, and dissolved oxygen were found in the surface and subsurface waters above the top of Grappler Seamount. A cyclonic eddy-like feature located close to Grappler Seamount, in the satellite images, also suggests that eddies are being shed from the seamount region.

31860 **Use of land and sea based wind data in a simple circulation model.** Schwing, F.B.; Blanton, J.O. (Skidaway Institute of Oceanography, Savannah, Georgia 31416). *Journal of Physical Oceanography;* **14**: No. 1, 193-197(Jan 1984). Contract AS09-80EV10331.

The use of land based wind data in nearshore oceanographic work is common, but these winds do not accurately reflect coastal oceanic winds. Ocean winds are often underestimated by a factor of 2 and directional differences are also observed. Wind time series from land and sea regimes in the South Atlantic Bight (SAB) were applied to a reduced form of the momentum equation to estimate the alongshore current. Currents were closely approximated by ocean wind stress, but were consistently underestimated by land data. Further statistical analyses verified this discrepancy in speed and also indicated significant differences between ocean and speed-adjusted land winds. The bottom frictional coefficient required to balance alongshore momentum was unrealistically small when land based wind data were used as input.

64 PHYSICS. I.

REFER ALSO TO CITATION(S) 32062

31861 **(INIS-mf—8921) 1983 annual meeting. Program and abstracts.** (Israel Physical Society, Jerusalem). 1983. 95p. (CONF-8303128—Summ.). NTIS (US Sales Only), PC A05/MF A01. Order Number DE84780235.

From Israel Physical Society annual meeting; Ramat-Gan, Israel (24 Mar 1983).

Abstracts of individual items from the meeting were prepared separately for the data base.

6401 Astrophysics And Cosmology

31862 **(CONF-8405155—1) Three-dimensional model for fusion processes.** Olson, A.P. (Argonne National Lab., IL (USA)). 1984. Contract W-31-109-ENG-38. 24p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011731.

From Inner space/outer space conference; Batavia, IL, USA (2 May 1984).

Portions are illegible in microfiche products.

Active galactic nuclei (AGN) emit unusual spectra of radiation which is interpreted to signify extreme distance, extreme power, or both. The status of AGNs was recently reviewed by Balick and Heckman. It seems that the greatest conceptual difficulty with understanding AGNs is how to form a coherent phenomenological model of their properties. What drives the galactic engine? What and where are the mass-flows of fuel to this engine? Are there more than one engine? Do the engines have any symmetry properties? Is observed radiation isotropically emitted from the source? If it is polarized, what causes the polarization? Why is there a roughly spherical cloud of ionized gas about the center of our own galaxy, the Milky Way? The purpose of this paper is to discuss a new model, based on fusion processes which are not axisymmetric, uniform, isotropic, or even time-invariant. Then, the relationship to these questions will be developed. A unified model of fusion processes applicable to many astronomical phenomena will be proposed and discussed.

31863 **(LA-UR—84-1640) Theoretical study of Cepheid light curves.** Davis, C.G. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 5p. (CONF-8405180—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012453.

From IAU colloquium; Toronto, Canada (29 May 1984).

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Starting with the initial understanding that pulsation in variable stars is caused by the heat engine of Hydrogen and Helium ionization in their atmospheres (A.S. Eddington in Cox 1980) it was soon realized that non-linear effects were responsible for the detailed features on their light and velocity curves. With the advent of the computer we were able to solve the coupled set of hydrodynamics and radiation diffusion equations to model these nonlinear features. This paper describes some recent model results for long period (LP) Cepheids in an attempt to get another handle on Cepheid masses. Section II discusses these results and Section III considers the implications of these model results on the problem of the Cepheid mass discrepancy.

31864 **(LA-UR—84-1666) Photon losses in cosmic ray acceleration in active galactic nuclei.** Colgate, S.A. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 7p. (CONF-840280—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012583.

From Recontre de Moriond meeting on electro weal interactions and unified theories; La Plaque, France (26 Feb 1984).

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The usual assumption of the acceleration of ultrahigh energy cosmic rays, $\geq 10^{18}$ eV in quasars, Seyfert galaxies, and other active galactic nuclei is challenged on the basis of the photon interactions with the accelerated nucleons. This is similar to the effect of the black body radiation on particles $> 10^{20}$ eV for times of the age of the universe except that the photon spectrum is harder and the energy density greater by $\cong 10^{13}$. Hence, a single traversal, radial or circumferential, of radiation whose energy density is no greater than the emitted flux will damp an ultrahigh energy cosmic ray 10^{20} eV by greater than 10^4 times its energy. Hence, it is unlikely that any reasonable configuration of acceleration can avoid disastrous photon energy loss. A different site for ultrahigh energy cosmic ray acceleration must be found.

31865 **(LA-UR—84-1667) Galactic acceleration of ultra-high energy cosmic rays.** Colgate, S.A. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 5p. (CONF-840280—4). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012442.

From Recontre de Moriond meeting on electro weal interactions and unified theories; La Plaque, France (26 Feb 1984).

Ultrahigh energy cosmic rays are likely to originate in old galaxies because of the difficulty with acceleration in special extragalactic circumstances. An extended magnetic field in the galaxy is necessary to give sufficient time dispersion from supernova events if supernova are the origin of such particles. Acceleration must be either parallel to a magnetic field such as would occur during the initial formation of a magnetic neutron star, or formed in the relativistic supernova envelope shock.

31866 **UV-by photometry in M39 and δ Lyrae.** Anthony-Twarog, B.J. (Department of Physics and Astronomy, University of Kansas, Lawrence, Kansas 66045). *Astronomical Journal;* **89**: No. 5, 655-662(May 1984).

Photoelectric UV-by observations have been obtained for stars in the mid-B to early-A spectral range in the fields of M39 and δ Lyrae. The color and luminosity calibrations of Crawford for B, A, and F stars have been employed, as well as the new calibration for A0 stars of Hilditch et al. (1983). The resulting distance modulus for M39 is 7.23, with a mean E(b-y) color excess of 0.025. A distance modulus of 7.29 and a mean reddening of 0.032 has been derived for ten stars in the field of δ Lyrae, but the existence of a cluster is not strongly indicated in the present study. Comparison of photometric and rotational velocity data for the M39 stars confirms a correlation between δc_0 and rotational velocity for A and A0 stars, and suggests that an evolutionary correction of only $-3\delta c_0$ be employed for stars in both spectral classes.

31867 **Galaxy N-point correlation functions: Theoretical amplitudes for arbitrary N.** Fry, J.N. (Astronomy and Astrophysics Center, The University of Chicago). *Astrophysical Journal, Letters to the Editor;* **277**: No. 1, L5-L8(1 Feb 1984). Contract AC02-80ER10773.

Scaling arguments have suggested the hierarchical form of galaxy N-point correlation functions, κ/sub N/ = Q/sub N/ξ/sup N/-1, where ξ is the two-point function, but such arguments are inherently unable to predict the amplitudes Q/sub N/. Assuming this form, substituting in the BBGKY hierarchy, and using graph theory combinatories, I find amplitudes Q/sub N/ = (4Q/N)/sup N/-2N/(2N-2), where Q is the reduced three-point amplitude. As an application, I compute the probability of large void regions in the hierarchical picture.

31868 **Astrophysics and grand unification.** Kolb, E.W. (Los Alamos National Laboratory, Los Alamos, NM). pp 177-190 of Gauge theories, massive neutrinos, and proton decay. Kursunoglu, B.; Perlmutter, A. New York, NY; Plenum Publishing Corp. (1981). (CONF-810134—).

From Orbis scientiae conference; Fort Lauderdale, FL, USA (19 Jan 1981).

This chapter reviews the impact of grand unified theories on astrophysics and cosmology. Discusses the possibility of generating the observed baryon asymmetry in the hot big bang early universe within the framework of models based on SU(5). Finds that the final baryon number depends on the expansion rate of the universe when some boson decays. If the expansion rate is decreased at the time of boson decay, there will be more time for thermalizing reactions resulting in a smaller baryon to photon ratio. If the expansion rate is increased at the time of boson decay, the baryon to photon ratio will be larger because of less inverse reactions prior to freeze out. Concludes that any spatial variations in the expansion rate at the time of boson decay will be mapped onto spatial variations in the baryon to photon ratio. Points out that such variations are called isothermal perturbations, and may be important in the gravitational instability theory of galaxy formation.

6402 Atmospheric Physics

31869 **(INIS-mf—8968, pp 132-135) Negative acid cluster ion hydration studies of atmospheric interest.** Glebe, W.; Arnold, F. (Max-Planck-Institut fuer Kernphysik, Heidelberg (Germany, F.R.)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Hydration of $HSO^-_4(H_2SO_4)$sub(m) cluster ions with m=0, 1, 2, 3, 4 which are important in the stratosphere was studied at room temperature using a new high pressure ion source/ion drift cell apparatus. Equilibrium constants for hydration are found to decrease steeply from m=0 to m=1 and to increase again for $m > 2$. This behaviour is similar to what has been observed in the stratosphere. Estimated ΔH^0 values, however, appear to be lower than the inferred stratospheric data.

31870 **(LA-UR—84-1504) Suprathermal ions upstream of the earth's bow shock.** Thomsen, M.F. (Los Alamos National Lab., NM (USA)). Apr 1984. Contract W-7405-ENG-36. 47p. (CONF-840256—4). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012625.

From Chapman conference on collisionless shock waves in the heliosphere; Napa Valley, CA, USA (20 Feb 1984).

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Two principal mechanisms have been proposed for achieving acceleration to MeV range energies: (1) Fermi acceleration through multiple scattering off of irregularities up- and downstream of the shock; and (2) shock-drift acceleration, in which particles gain energy by drifting in the inhomogeneous magnetic field of the shock in a direction parallel to the convection electric field and the solar wind. Both of these energization mechanisms require an initial seed population of suprathermal particles. Although it has been suggested that the ordinary ion heating that occurs at the shock might provide enough hot particles for the Fermi process. The effectiveness of the shock-acceleration mechanisms is enhanced if there exists an initial suprathermal ion population created by additional shock-related processes. Such suprathermal particles are indeed observed in association with collisionless shocks, and an extensive body of observational and theoretical work has been directed toward characterizing them and understanding their origin. It is the purpose of this report to review the nature of the various populations of shock associated suprathermal ions, with particular emphasis on the ion foreshock region of the Earth's bow shock. We also assess the current understanding of the possible origins of those populations.

31871 **(RL—83-079) Interaction between the precipitating electrons and the auroral plasma.** Bingham, R.; Bryant, D.A.; Hall, D.S. (Rutherford Appleton Lab., Chilton (UK)). Aug 1983. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701711.

The excitation of Langmuir turbulence due to the presence of a directed high energy electron stream in the aurora plasma can modify the behaviour of ion acoustic waves and lead to a modulational type instability. The effect of the turbulence on the plasma is to provide a low frequency force, the ponderomotive force, this force interacts with the low frequency modes changing their dispersion relations. The high frequency turbulence undergoes a modulational type instability leading to a bunching of the Langmuir turbulence in space. An effective temperature Tsub(eff) due to Langmuir turbulence can be derived.

6403 Atomic, Molecular, And Chemical Physics

REFER ALSO TO CITATION(S) 32034, 32262, 32274, 32280

31872 **(CTOM—43100) Precise atomic masses and mass differences for Hf, Ta, W and Re.** Sharma, K.S. (Manitoba Univ., Winnipeg (Canada)). Jun 1979. 122p. Canadian Theses on Microfiche Service, National Library of Canada, Ottawa K1A 0N4.

The stability of operation and the sensitivity of the Manitoba II spectrometer have been improved, making it possible to redetermine the results for two doublets involving ^{180}W and ^{174}Hf. The mass difference ^{181}Ta-^{180}Ta has also been determined for the first time by a mass spectrometric technique. A total of 16 new doublet spacings have been determined, making available a completely overdetermined set of mass differences between the naturally-occurring isotopes of Hf, Ta, W and Re. A set of self-consistent masses and mass differences was derived from these data. The systematic properties of the calculated Ssub(2n) values have been interpreted in terms of Nilsson single particle levels. The data are also used to determine the ground state energy level structure at A = 180.

31873 **(CTOM—46136) Application of the muonium spin rotation technique to a study of the gas phase chemical kinetics of muonium reaction with the halogens and hydrogen halides.** Garner, D.M. (British Columbia Univ., Vancouver (Canada)). Jun 1979. 319p. Canadian Theses on Microfiche Service, National Library of Canada, Ottawa, K1A 0N4.

Rate constants and activation energies are reported for the gas phase reactions Mu + F_2 → MuF + F and Mu + Cl_2 → MuCl + Cl at temperatures between 300 and 400 K, and room temperature rate constants are reported for the reactions Mu + Br_2 → MuBr + Br and Mu + HX → MuH + X or MuX, where Mu = muonium and X = Cl, Br, I. While in most of these systems Mu reacts considerably faster than the H isotopes, attention is focussed on hydrogen isotope effects in the Mu = F_2 and Mu + Cl_2 reactions. Quantum tunnelling manifests itself in the Mu + F_2 reaction by increasing the molecular rate constant in two ways: the bimolecular rate constant for the Mu reaction (1.4 x 10^{10} l/mole-s) is at least six times that for the analogous H atom reaction, and the apparent Arrhenius activation energy of the Mu reaction (0.9 kcal/mole) is less than one half that for H + F_2. The Mu + Cl_2 reaction does not show any strong isotope effects at 300K. Quantitative isotope effects cannot be defined for the Mu + Br_2 and Mu + HX reactions and their hydrogen isotopic analogues because of the absence of sufficient experimental and theoretical data. These reactions are discussed in terms of the general theory of isotope effects.

31874 **(DOE/ER/13097—1) Production and destruction of metastable negative ions. Progress report, September 1, 1983-August 31, 1984.** Pegg, D.J. (Tennessee Univ., Knoxville (USA). Dept. of Physics). 1984. Contract AS05-83ER13097. 6p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012465.

Portions are illegible in microfiche products.

Considerable progress has been made in the fabrication, installation and testing of a universal ion source, two alkali vapor charge-exchange cells and an experimental chamber housing an electron energy analyzer and a charge state analyzer. In addition a computer-based data acquisition and analysis system has been installed and is in the process of being tested. At this state measurements on the production of Ca^- are expected to be made.

31875 **(DOE/ER/40001—T2) Optically pumped polarized alkali atomic beams and targets.** Anderson, L.W. (Wisconsin Univ., Madison (USA). Dept. of Physics). 1984. Contract AC02-81ER40001. 28p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012389.

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The optical pumping of ^{23}Na and ^6Li atomic beams is discussed. Experiments on the optical pumping of ^{23}Na atomic beams using either a single mode dye laser followed by a double passed acousto-optic modulator or a multimode dye laser are reported. The optical pumping of a ^{23}Na vapor target for use in a polarized H^- ion source is discussed. Results on the use of viton as a wall coating with a long relaxation time are reported. 31 references, 6 figures, 3 tables.

31876 (DOE/ER/60142—1, pp 31-41) **Molecular ion beam experiment: determination of ion beam composition and the distribution of paired ion separations.** Marino, S.A.; Rossi, H.H.; Zaider, M.; Fils, R.; Rau, V. (Hanscom Air Force Base, MA; Emmanuel College, Lexington, MA). Jul 1983. NTIS, PC A16/MF A01. Order Number TI83015574.

In Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983.

The analysis of the cell survival data for the molecular ion beam experiment has led to two questions related to the physics of the cell irradiations: was the fraction of the ion beam which was molecular ions accurately measured, and is the distribution of separations between paired atomic ions used in the analysis the same as that incident on the cells. An experiment was performed at the vertical Van de Graaff facility at Los Alamos National Laboratory to determine the ion beam compositions and ion separation distributions for the diatomic deuteron beams used for cell irradiations both at Radiological Research Accelerator Facility and at Los Alamos. 3 references, 4 figures.

31877 **(INIS-mf—8342) Secondary electron spectra in the trace of fast ions in water vapor.** Kollerbaur, J. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Elektrotechnik). 1981. 65p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number TI84701919.

The spectral electron fluence near the trace of 1 MeV protons in gases has been studied in the energy range 1-2600 eV as a function of the radial distance from the trace, and for different orientations of the direction of observation relative to the trace. This parameter allows for a comparison with Monte-Carlo transport calculations. Integral quantities, such as the equilibrium electron spectrum and the radial energy fluence are obtained by integration. A special measuring system is described with a 3-grid-retarding-field analyser and a channeltron for electron detection. (DG).

31878 **(INIS-mf—8350) Measurement of the triple differential cross section for the ionization of inner shells by relativistic electron impact.** Schuele, E. (Tuebingen Univ. (Germany, F.R.). Fakultaet fuer Physik). 8 Jul 1982. 60p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number TI84701918.

The absolute triple differential cross section for the ionization of the K-shell of silver by relativistic electron impact was measured. A coincidence method was applied for measurement of both outcoming electrons after ionization.

31879 (INIS-mf—8365, pp 52-53) **Production of excited projectile states by electron capture in fast ion-atom collisions.** Betz, H.D.; Roeschenthaler, D.; Rothermel, J.; Bell, F. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

31880 (INIS-mf—8365, pp 53-54) **Ionisation of Rydberg ions.** Roeschenthaler, D.; Betz, H.D.; Jakubassa, D.; Bell, F. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

31881 (INIS-mf—8365, pp 56) **Total cross section for inner-shell ionisation by fast ions.** Spies, R.; Bell, F. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

31882 (INIS-mf—8365, pp 55) **Compton profiles in solids by inelastic ion-electron scattering.** Boeckl, H.; Bell, F.; Betz, H.D. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

31883 (INIS-mf—8901, pp 304-308) **Plasma-surface interaction data relevant to fusion and IAEA activities in this field.** Katsonis, K. (International Atomic Energy Agency, Vienna (Austria). Atomic and Molecular Data Unit). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

An overview of the processes and materials where data to be used as input to modelling of plasma-surface interactions have to be obtained; and the IAEA activies done in this field.

31884 (INIS-mf—8901, pp 16-21) **Comparison between measured and calculated ion neutralization electron spectra.** Hofer, W.; Varga, P. (Technische Univ., Vienna (Austria). Inst. fuer Allgemeine Physik). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Ejected-electron energy distribution resulting from neutralization of Ar^+ and Ar^{2+} ions on a tungsten surface are calculated and compared to the measured distribution. (G.Q.).

31885 (INIS-mf—8901, pp 27-37) **Electronic structure on metal surfaces by electron energy loss spectroscopy.** Netzer, F.P. (Innsbruck Univ. (Austria). Inst. fuer Physikalische Chemie). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Possibilities of applying energy loss of fast electrons (some 10 keV) passing through thin substrates to the studies of electron structure are discussed. Valence and core level excitations are taken into account. Clean and oxydised surfaces of Gd, Ir, Er, Yb are compared.

31886 (INIS-mf—8901, pp 38-42) **Surface reactions on Ce: Valence change monitored by core level electron energy loss spectroscopy.** Strasser, G.; Netzer, F.P. (Innsbruck Univ. (Austria). Inst. fuer Physikalische Chemie). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Core level electron energy loss spectroscopy has been applied to studies of valence changes of Ce during oxidation. The 'giant 4d → 4f resonances' are sensitive to valence change and indicate a change from 3+ to 4+ during surface oxidation. (G.Q.).

31887 (INIS-mf—8901, pp 43-44) **Chemical information from the KLV Auger spectra of silicon.** Riviere, J.C.; Crossley, J.A.A. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

KL_1V and KLsub(2,3)V Auger spectra of silicon, silicon monoxide, silica, silicon carbide, silicon nitride and some silicides have been recorded. It is concluded that some information on the local density of states around ionised atoms can be gained by these measurements.

31888 (INIS-mf—8901, pp 45-50) **Study of interfaces in the oxidised Fe/Si system: Use of the Auger parameter.** Riviere, J.C.; Crossley, J.A.A. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Measurements of the Auger Parameter for silicon in the interfaces exposed in oxidised Fe/Si alloys, when compared with similar measurements on standards, have provided valuable chemical information that is in agreement with theoretical predictions.

31889 (INIS-mf—8901, pp 93-102) **Surface structural studies using ion scattering.** Woodruff, D.P. (Warwick Univ., Coventry (UK)). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

A review paper. Single scattering is considered at high and low energies respectively. Finally multiple scattering effects are discussed. (G.Q.).

31890 (INIS-mf—8901, pp 110) **Band structure in high energy ion beam surface interaction at grazing incidence.** Winter, H.; Zimny, R.; Schirmacher, A.; Becker, B.; Andrae, H.J. (Muenster Univ. (Germany, F.R.). Inst. fuer Kernphysik); Froehling, R. (Freie Univ. Berlin (Germany, F.R.). Fachbereich Physik). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

31891 (INIS-mf—8901, pp 115-119) **Low dose sputtering experiments.** Emmoth, B.; Braun, M. (Stockholm Univ. (Sweden). Fysiska Institutionen). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Sputtering yields are function not only of the species and energy of the projectile and of initial target material but also of dose. He^+ ions were used on a nickel and a metal glass surface respectively. An interpretation of the data is also given.

31892 (INIS-mf—8901, pp 125-126) **Influence of oxygen partial pressure on the sputtering on metastable Ca-atoms.** Betz, C.; Husinsky, W.; Cirgis, I. (Technische Univ., Vienna (Austria). Inst. fuer Allgemeine Physik). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

The Ca target was bombarded with a 7 keV Kr^+ ion beams, and the metastable Ca atoms were excited by a dye laser to use the emitted light as an independent measure of sputtered quantity. The energy spectra of sputtered metastable Ca ions have been measured in function of oxygen partial pressure up to 5×10^{-5} torr.

31893 (INIS-mf—8901, pp 127-129) **Universal relation for the sputtering yield of monoatomic solids at normal ion incidence.** Bohdansky, J. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

A relation for the sputtering yield at normal incidence is given which resproduces measured data for light and heavy ions and holds as well for the threshold and the high ion energy regime. In addition an analytical relation is derived.

31894 (INIS-mf—8901, pp 135-139) **Analytical model for Rutherford ion backscattering from surfaces.** Samanta, P. (Maine Univ., Orono (USA)); Unertl, W.N. (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin (Germany, F.R.)). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

A simplified analytical model without adjustable parameters describing ion back scattering has been developed and compared with a Monte Carlo simulation for a Si<110> surface. Thermal vibrations are taken into account.

31895 (INIS-mf—8901, pp 140-144) **Rutherford backscattering, nuclear reaction and channeling studies of nitrogen implanted single-crystal stainless steel.** Ferguson, M.M. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Grenzflaechenforschung und Vakuumphysik); Whitton, J.L. (Copenhagen Univ. (Denmark)); Ewan, G.T. (Queen's Univ., Kingston, Ontario (Canada). Dept. of Physics); Mitchell, I.V.; Plattner, H.H. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

The three different methods were used to investigate a single crystal of stainless steel implanted to different doses by 40 keV $^{15}N_2^+$ ions. Conclusions are drawn on the position of nitrogen; comparison is made with implantation of deuterium and neon.

31896 (INIS-mf—8901, pp 145-149) **Light emission from grazing incidence interaction of light ions with clean Cu(110).** Willerding, B.; Snowdon, K.; Steininger, H.; Heiland, W. (Osnabrueck Univ., Osnabrueck (Germany, F.R.).); Tolk, N.H. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)); Eckstein, W. (Bell Telephone Labs., Inc., Murray Hill, NJ (USA)). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Photon yields were measured from Cu(110) bombarded by H^+, H_2^+ and He^+ with different energies. The energy dependence is different from previous studies at perpendicular incidence. A calculation of the energy dependence of resonant charge capture into the n=3 state of H is compared with experiment.

31897 (INIS-mf—8901, pp 157-162) **Electron induced sodium emission from NaCl surface.** Rutkowski, J. (Jagellonian Univ., Krakow (Poland). Institute of Physics); Poradzisz, A.; Szymonski, M. (Uniwersytet Jagiellonski, Krakow (Poland). Inst. Fizyki). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Experimental data are presented on the sputtering of NaCl surface by electrons with varying electron current density and at different target temperatures. The Na D doublet intensity due to sputtering of excited Na atoms has been simultaenously measured with the neutral Na flux. The results can be understood if it is assumed that the neutral Na atoms vaporize from partially sodium covered surface and can subsequently be excited in electron - atom collisions.

31898 (INIS-mf—8901, pp 163-173) **Geometric structure of surfaces studied with atomic-beam scattering.** Rieder, K.H. (IBM Research Lab., Zurich (Switzerland)). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

A brief survey on structural surface studies performed in the author's laboratory using He diffraction is given. Examples relate to ionic crystals, (un)reconstructed metal surfaces as well as selected adsorbate systems.

31899 (INIS-mf—8901, pp 174-179) **Adsorbate migration on macroscopic surfaces investigated by means of He beam scattering.** Poelsema, B.; Verheij, L.; Comsa, G. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Grenzflaechenforschung und Vakuumphysik). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

It was demonstrated that He scattering is a straightforward means to study adsorbate migration on defect free regions of macroscopic crystals, at very low coverages. Due to its low energy and inertness the He beam does not disturb the adsorbates. The procedure gives additional information about island formation, defect annealing and defect density (titration).

31900 (INIS-mf—8901, pp 180-185) **Scattering of ^{20}Ne atoms from the (001) face of LiF.** Semerad, E.; Hoerl, E.M. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H. Inst. fuer Metallurgie). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

An apparatus for measurements of inelastic scattering processes of gas atoms from crystal surfaces is described. Scattering experiments with Neon atoms of thermal energy on the (001) LiF surface in the <100> azimuth are discussed. Inelastic scattering shows large contributions of single phonon interactions as well as of modes originating from the bulk bands.

31901 (INIS-mf—8901, pp 186-191) **Field ion microscopy of silicon.** Sakata, T. (Osaka Univ. (Japan)); Block, J.H. (Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin (Germany, F.R.)). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Field ion images of silicon when using hydrogen, silane, oxygen and nitrogen as image gas are compared.

31902 (INIS-mf—8901, pp 198-203) **Hydrogen recombination reaction on Ni investigated with atomic beams.** Wilsch, H.; Hoinkes, H.; Kaarmann, H. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Physikalisches Inst.). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

An atomic hydrogen beam was used to investigate adsorption, desorption and recombination of atomic hydrogen on a Ni (110) surface. The beam could be switched from protonium to deuterium to enable a discrimination by mass spectrometry of chemisor bed versus non-chemisorbed particles in the reaction products. It is found that the hydrogen atoms recombine through a precursor mechanism. Inpurity coverages of carbon or sulfur greatly reduce the hydrogen recombination rate.

31903 (INIS-mf—8901, pp 314-319) **Collisions of singly and doubly charged ions with oxygen molecules in the energy range 1 - 1800 (3600) eV.** Kuen, I.; Howorka, F. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

Absolute cross sections for the excitation of optically emitting states in collisions of He^+, Ne^+, Ar^+, Kr^+, B^+, He^{++}, Ne^{++} and Ar^{++} with oxygen molecules are measured, the energy range of the ion being1 - 1800 eV Lab for the singly charged and 1 - 3600 eV for the doubly charged ions. Seven important processes can be distinguished: charge exchange excitation of O_2^+ band, O I, O II, X I and X II lines (X^+, X^{++} being the primary ion), direct excitation of X II and double charge exchange excitations. The energy dependences of the excitation cross sections are remarkably different for different processes but similar for one process with different ions. The sum total of all cross sections together for excitations which lead to light emission is on the order of a few square angstroms at 1000 eV c.m. energy. The results are of interest for surface investigations, plasma diagnostics and laser work.

31904 (INIS-mf—8901, pp 74-80) **Spin polarized electrons in surface science.** Siegmann, H.C. (Eidgenoessische Technische Hochschule, Zurich (Switzerland). Lab. fuer Festkoerperphysik). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

The potentialities of spin-polarised electron beams as a probe of surface magnetic properties are outlined. Elastic as well as inelastic scattering of electrons from solid surfaces are considered.

31905 **(INIS-mf—8901) 3S'83 Symposium on surface science. Contributions.** Braun, P.; Betz, G.; Husinsky, W.; Soellner, E.; Stoeri, H.; Varga, P. (eds.). (Technische Univ., Vienna (Austria). Inst. fuer Allgemeine Physik). 1983. 319p. (CONF-830120—Exc.). NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920.

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

This symposium included the topics: electronic structure; ion-surface-interaction; surface structure; adsorption and reactivity; surface analysis; 60 papers were presented, only part of which pertain to INIS.

31906 **(INIS-mf—8939) Mass spectrometric determination of partial electron impact ionization cross sections of No, No_2, and N_2O from threshold up to 180 eV.** Kim, Y. B. (Innsbruck Univ. (Austria)). 1982. 113p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE84701779.

Electron impact ionization of nitric oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O) has been studied as a function of electron energy up to 180 eV with a double focussing mass spectrometer Varian MAT CH5 and an improved Nier type electron impact ion source. Relative partial ionization cross sections were measured for the processes $NO^+ + 2e$, $NO^{++} + 3e$, and $NO_2 + e$ -> $NO^+{}_2 + 2e$, $NO^{++} + 3e$ and $N_2O + e$ -> $N_2O^+ + 2e$. An accurate measurement of the cross section ratios $q(NO^{2+}/NO)/q(NO^+/NO)$ and $q(NO^2{}_2/NO_2)/q(NO^+{}_2/NO_2)$ has been made. Relative cross section functions were calibrated absolutely with two different normalization methods. Moreover, both metastable and collision induced dissociations of N_2O^+ were studied quantitatively using the technique of decoupling the acceleration and deflection electric fields. Using the n- th root extrapolation the following ionization potentials have been derived from the cross section functions near threshold: $NO^+(X^1\Sigma^+)$; NO^{++}; $NO^+{}_2$; $NO_2{}^{++}$; $N_2O^+(X^2\pi)$. These results are compared with previous measurements and theoretical calculations, where available. Part of the results presented have been already published in seven papers by the author.

31907 **(INIS-mf—8940) Investigation of ion mobilities in different buffer gases.** Peska, N. (Innsbruck Univ. (Austria)). 1981. 209p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE84780268.

An existing drift apparatus has been adapted to mobility measurements. Mobilities of C^+/He, CH^+/He, CH_2^+/He and CH_3^+/Ar, hitherto unknown or known with low accuracy only, have been determined over the E/N range of about 20 - 200 Td.

31908 **(INIS-mf—8944) Tomographic determination of the energy-density-distribution in an electron beam used for machining.** Kirner, F.K. (Technische Univ., Vienna (Austria)). 1983. 135p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84780271.

Several methods for measuring the distribution of the power-density in electron beams have been developed so far. Most of these techniques examine the beam with an approach only from one or two particular sides. They are appropriate only for circular-symmetrical or elliptical beam shapes. This research report deals with a new method, which allows the measurement of power-density-distributions of arbitrary shape. A straight edge for sampling the beam has been selected. A data acquisition system controlled by a microprocessor was developed, which gives the opportunity to sample the beam from various angels. After differention of the signal derived from the scanning unit it represents the projection of the current density parallel to the scanning direction. Circular symmetrical and elliptical beam shapes are reconstructed using the inversion of Abel's integral equation. Arbitrary beam shapes are computed by means of the 'Computed Tomography'. After discussion of various mathematical methods for reconstructing two-dimensional functions from their line-integrals, the so called 'Convoluted Backprojection' was chosen. The spatial resolution and the noise amplification of the discussed algorithms are calculated. It was proven that the quality of the tomographic reconstruction technique exceeds the 'Abel'-inversion not only in reconstructing arbitrary shapes but also in resolution and low noise. (Author).

31909 **(INIS-mf—8958) Investigation of energy dependent light emission cross sections for He^+-A_2 and $A^+{}_2$-He collisions and their interpretation by a Landau-Zener-model.** Federer, W. (Innsbruck Univ. (Austria)). 1982. 101p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780270.

An apparatus for investigations of reaction channels of inelastic ion collisions with a gas target by photon spectroscopy is described. The incoming energy can be varied between 0 and 1800 eV and the emitted light can be observed in the range 2000-9000 A. First the emission spectra of He^+-Ar and Ar^+-He collisions is measured and interpreted. Then the energy dependence of several line intensities are measured and transformed to absolute emission cross-sections. Several types of cross section versus energy curves are distinguished. They are finally interpreted in the framework of a semiclassical model of a quasi-molecule built from the two colliding partners.

31910 (INIS-mf—8962, pp A1) **Ab-initio calculation of uranium partition functions.** Mack, J.M.; Radziemski, L.J.; Kerley, G.I.; Sparks, W.M. (Los Alamos National Lab., NM (USA)). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

31911 (INIS-mf—8968, pp 66-71) **Calculation of electron swarm parameters in electro-negative gases - SF_6, H_2O and F_2 -.** Hayashi, M.; Nimura, T. (Nagoya Inst. of Tech. (Japan)); Ushiroda, S. (Toyota Central Research and Development Labs., Inc., Nagoya (Japan)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Values of the electron swarm parameters, such as the electron drift velocity W, the characteristic energy eDsub(T)/u, the Townsend's ionization coefficient α and the attachment rate coefficient ksub(a), are calculated by the Boltzmann equation and a Monte Carlo simulation (MCS) method.

31912 (INIS-mf—8968, pp 79-84) **Swarm experiments in gas mixtures.** Crompton, R.W.; Petrovic, Z.L.; Haddad, G.N. (Australian National Univ., Canberra. Research School of Physical Sciences). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Some recent work done in the author's laboratory on the measurment and interpretation of electron transport in gas mixtures is reviewed. Attachment rates and diffusion coefficients in O_2-N_2 and O_2-CO_2 mixtures were obtained with special attention to corrections of attachment cooling. More reliable values of these two quantities in pure O_2 and H_2O can be obtained in this way. Applicability of Blanc's law use this context is discussed. Similary, CO-Ar mixtures were used to obtain the momentum transfer cross sections sigma sub(vsub(0→1)), and sigma sub(ex) for the $a^3\pi$ transition in pure CO.

31913 (INIS-mf—8968, pp 85-90) **Measurement of eDsub(L)/μ of electrons in liquid xenon.** Doke, T.; Suzuki, S. (Waseda Univ., Tokyo (Japan). Science and Engineering Research Lab.); Shibamura, E. (Saitama College of Health, Kami-ohkubo 519, Urawa-shi 338, Saitama-ken, Japan); Masuda, K. (Univ.of Coimbra, Portugal). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

A new method for measuring the spread of electron swarm drifting under uniform electric field in liquid xenon is proposed. This is made by observing the width of scintillation pulse produced by drifting electrons in the vicinity of a thin center wire of a proportional scintillation counter, put in the end part of the electron drift space. From the spread of electron swarm and its drift time, the ratio of longitudinal diffusion coefficient to mobility epsilon sub(L) = eDsub(L)/μ for electrons in liquid xenon is directly obtained. epsilon sub(L) of electron swarms under the various electric fields have been measured and compared with epsilon sub(T) = eDsub(T)/μ previously obtained under the same electric fields.

31914 (INIS-mf—8968, pp 98-102) **High-Rydberg atom as a probe to low energy electron rare-gas collisions.** Matsuzawa, M.; Sato, Y. (University of Electro-Communications, Chofu, Tokyo (Japan)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

It is shown that one can get information on scatterings of extremely slow electrons by rare-gas atoms from Rydberg rare-gas atom collisions. Zero-energy scattering length of Xe is tentatively estimated to be -(7.2+-sup(1.3)sub(1.6))a_0 from the experimental data on Xe**(nf)-Xe l mixing collisions.

31915 (INIS-mf—8968, pp 103-108) **Use of N_2 molecules for detection of rare gas metastables in swarm experiments.** Bozin, J.V.; Urosevic, V.V.; Petrovic, Z.L. (Belgrade Univ. (Yugoslavia). Inst. za Fiziku). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

A method of concentration measurements of rare gas metastables in weakly ionized gases is proposed and elaborated. Transfer of the excitation energy to N_2 molecules is used to evaluate excitation coefficients. A stationary non-self sustained discharge is produced in a uniform electron field in mixtures Ar-N_2, Ne-N_2 and He-N_2 with c = 1% N_2, where an electron swarm is formed and the subsequent N_2 radiation is measured absolutely. Excitation coefficients of Arsup(m) (4^3P_2 + 4^3P_0), Nesup(m) (3^3P_2 + 3^3P_0), Hesup(m) (2^3S_1 + 2^3S_0) are obtained and compared to theoretical calculations.

31916 (INIS-mf—8968, pp 118-120) **Reaction of O_2^+ ions with CH_4.** Durup-Ferguson, M. (Univ.of Paris-Sud, FR); Boehringer, H. (Max-Planck-Institut fuer Kernphysik, Heidelberg (Germany, F.R.)); Ferguson, E.E. (Colorado Univ., Boulder (USA)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Of the possible reactions, the most endothermic one $O_2^+ + CH_4 \rightarrow CH_3O_2^+ + H + 111$Kcal Mol^{-1} is investigated. Recent information from the groups in Innsbruck, Boulder and Meudon, is used to derive a detailed reaction mechanism for this reaction. The life time of the $(O_2^+ + CH_4)^*$ complex is estimated to be approximately= 10^{-7} s at 20 K (part of the paper has disappeared due to an error in printing). (G.Q.).

31917 (INIS-mf—8968, pp 122-126) **Measurements of ion-molecule reaction rates constants at very low trempera-ture (20 K - 160 K) : the CRESU technique.** Rowe, B.R.; Dupeyrat, G.; Marquette, J.B. (Centre National de la Recherche Scientifique, 92 - Meudon-Bellevue (France). Lab. Aime-Cotton). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

It has been recognized recently that complex molecules can be formed at temperatures 10-100 K in dense interstellar clouds by ion-molecule reactions. To study these reactions in the laboratory a new technique has been developed and is described giving reaction rate constants for low temperatures. The new technique overcomes the problem of condensation of neutral reactants on the wall. Rate constants were derived from data taken for temperatures between 20 K and 160 K for the reactions O_2^+ (^{2}sigma) + CH_4(^{1}A) $\rightarrow$ $CH_3O_2^+$ (^{1}A) + H (^{2}S);$N_2^+ + 2N_2 \rightarrow N_4^+ + N_2$; $O_2^+ 2O_2 \rightarrow O_4^+ + O_2$; The new technique is supposed to offer the same chemical versatility as the flowing afterglow.

31918 **(INIS-mf—8968) 3rd international swarm seminar. Proceedings.** Lindinger, W.; Villinger, H.; Federer, W. (eds.). (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik). 1983. 275p. (CONF-8308112—). NTIS (US Sales Only), PC A12/MF A01. Order Number DE84780269.

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

47 papers on various problems of ion physics have been presented. The session headings are 1) recombination and electron attachment 2) transport of electrons in gases and liquids 3) swarm studies on collisions of metastable and on collisions of Rydberg atoms 4) ion neutral-interactions 5) ion transport in gases 6) applied aspects of swarm studies.

31919 (INIS-mf—8968, pp 42-45) **Electron attachment coefficients determined using a flowing afterglow/langmuir probe (FALP) apparatus.** Adams, N.G.; Smith, D.; Alge, E. (Birmingham Univ. (UK)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The attachment of thermal electrons to SF_6, CCl_4, CCl_3F, CCl_2F_2, $CHCl_3$ and Cl_2 has been studied over the temperature range 200-600K using a flowing afterglow/Langmuir probe apparatus. Results were obtained for the electron attachment coefficients as a function of temperature, and the activation energies for electron attachment reactions of CCl_3F, CCl_2F_2, $CHCl_3$ and Cl_2 have been derived.

31920 (INIS-mf—8968, pp 46-54) **Characteristic energy of low-energy electrons in Ne, Kr, and Xe gases.** Ogawa, I.; Koizumi, T.; Murakoshi, H. (Hitachi Ltd., Kokubunji, Tokyo (Japan). Central Research Lab.); Yamamoto, S.; Shirakawa, E. (Rikkyo Univ., Tokyo (Japan). Dept. of Physics). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Measurements have been made of the characteristic energy epsilon sub(k) = eD/μ (D: transverse diffusion coefficient; μ: mobility) of low-energy electrons in Ne, Kr, and Xe gases and in He/Ne gaseous mixtures by the Townsend method as a function of the reduced electric field E/N, where E denotes the field strength and N the number density of gas atoms. The momentum transfer cross section qsub(m) for electrons in Ne as derived from the data was found to be in excellent agreement with previous estimates obtained with different methods, particularly for energies ranging from 0.1 to 0.5 eV, and in fair agreement with any of the three theoretical results by Thompson, by Garbaty and La Bahn, and by Yau, McEachran and Stauffer. The characteristic energies obtained for Kr and Xe were both somewhat larger than the calculated values by Forst and Phelps and point to a sharper Ramsauer minimum in qsub(m) than reported by these authors. The data for He/Ne mix-

tures were explained fairly well by a calculation based on the Townsend method of average electrons.

31921 (INIS-mf—8968, pp 115-117) **Vibrational relaxation of molecular ions in flow-drift tubes.** Ferguson, E. (Paris-11 Univ., 91 - Orsay (France). Lab. de Physico-Chimie des Rayonnements). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The author is referring to vibrational relaxation measurements of N_2^+(v), O_2^+(v), NO^+(v), CO_2^+, H_2O^+ carried out in Flow Drift Tubes in Innsbruck, Boulder and Meudon. Different monitor gases were injected into the tube ahead of the sampling part to detect different vibrational levels (v) of the molecular ions. Kinetic energy dependencies of the quenching rate constants are determined by application of an electric field to the drift tubes. There is a strong correlation between vibrational quenching rate and the strength of the electrostatic interaction between the ion and the quencher. A model is proposed where complexes are formed between the molecular ion and quenching neutral with a rate constant ksub(c). The complexes either unimolecularly dissociate with rate constants ksub(u) or vibrationally predissociate to give a vibrationally relaxed ion and the neutral with a rate constant ksub(vp). The relatively large electrostatic ion-neutral bonds lead to much larger vibrational relaxnts for ions than are generally found for comparable neutrals.

31922 (INIS-mf—8968, pp 136-143) **Production and loss of H^- in a hollow cathode discharge.** Grindhammer, M.; Kuen, I.; Howorka, F. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik); Bryant, H.C. (New Mexico Univ., Albuquerque (USA). Dept. of Physics and Astronomy). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The contribution of H^- ions to the total density of carriers in a hollow cathode discharge in hydrogen is investigated. Production and loss rates are calculated using cross sections and rate constants from the literature. The ions are extracted from the plasma through a thin metallic hole probe into a magnetic mass spectrometer. The hollow cathode can be moved radially with respect to the hole probe so that ion density distributions are obtained as functions of discharge pressure, discharge current and extraction potential. Finally, the predictions of a model for H^- density for pressures ranging between 0.15 and 0.30 Torr are compared with measurements at a discharge current of 14 mA. It is concluded that in the production processes dissociative electron attachment plays the most important role, ion pair production shows a small contribution of 2%. Dissociative recombination of positive ions is negligible. The loss processes contribute more evenly. Mutual recombination, associative ionization and electron detachment play a role.

31923 (INIS-mf—8968, pp 144-148) **Energy dependence of the clustering reactions of Li^+ ions with some atmospheric gases.** Satoh, Y.; Takebe, M.; Iinuma, K.; Seto, K. (Tohoku Univ., Sendai (Japan). Faculty of Engineering). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The clustering reactions of Li^+ ions with N_2, O_2, CO, and CO_2 molecules have been investigated using a conventional drift tube over a wide range of ion energy at near room temperature. The forward rate coefficients were found to be inverse proportional to the ion energy. On the other hand, the backward rate coefficients rapidly increased with ion energy. An Arrhenius plot of the backward rates provides the activation energy, which is closely related to the minimum of the interaction potential.

31924 (INIS-mf—8968, pp 149-150) **Temperature dependences of the $N_2^+ + N_2 \rightarrow N_4^+$ and $O_2^+ + O_2 \rightarrow O_4^+$ association reactions.** Boehringer, H.; Arnold, F. (Max-Planck-Institut fuer Kernphysik, Heidelberg (Germany, F.R.)); Smith, D.; Adams, N.G. (Birmingham Univ. (UK)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The temperature dependencies of three body association reactions have been investigated in attempts to elucidate the mechanisms of ion-molecule association. The variation with temperature of the three-body rate coefficients is described usually as a power law k approximately Tsup(-n). Experience has shown that with measurements over limited temperature ranges as with previous methods the derived coefficients n are wrong and measurements over large temperature ranges are desirable. The selected ion flow-tube and the drift tube methods developed in Birmingham and Heidelberg provide measurements over (overlapping) wide temperature rang. In collaboration of the Birmingham and the Heidelberg group the He stabilized reactions $N_2^+ + N_2 + He \rightarrow N_4^+ + He$ and $O_2^+ + O_2 + He \rightarrow O_4^+ + He$ reactions over 30 to 600 deg K. A power law dependence is found above 100 K. The temperature dependencies of the rate constants are interpred and used as a critical test of recent theories of association reactions by D.R. Bates and E. Herbst. (G.Q.).

31925 (INIS-mf—8968, pp 151-152) **Laboratory studies of H/D exchange in the reactions of H_3^+ with H_2.** Adams, N.G.; Smith, D. (Birmingham Univ. (UK)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The overall forward (exoergic) rate coefficients ksub(f), and the overall reverse (endoergic) rate coefficients, ksub(r), the product ion distributions are obtained at one or more temperatures. The equilibrium constants, K=ksub(f)/ksub(r) and hence ΔH^0 and ΔS^0 for the individual reaction channel can be determined from these data. Of the ten reactions in the $H_3^+ + H_3$ series, four representative reactions are discussed. The studies demonstrate the controlling influence of the enthalpy and entropy differences on isotopic exchange reactions. They also demonstrate that isotopic scrambling occurs in relatively long lived intermediate complexes at low temperatures, whereas at higher temperatures the simpler mechanism of proton (or deuteron) transfer is favoured. The data on these reactions also add to the body of data on ion-molecule isotope exchange reactions which invariably show that the rate coefficients for the exoergic reactions, ksub(f), approach the collisional limiting values, ksub(c) at low temperatures (i.e. when $T < '\Delta H^0/R'$).

31926 (INIS-mf—8968, pp 158-163) **Temperature dependence of three-body ion-molecule reactions.** Boehringer, H.; Arnold, F. (Max-Planck-Institut fuer Kernphysik, Heidelberg (Germany, F.R.)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The temperature dependence of the ion-molecule association reactions (i) $N_2^+ + N_2 + M \rightarrow N_4^+ + M$ (M=N_2, He), (ii) $O_2^+ + O_2 + M \rightarrow O_4^+ + M$ (M=O_2, He) and (iii) $He^+ + 2He \rightarrow He_2^+ + He$ have been studied over an extended temperature range to temperatures as low as 30K with a recently constructed liquid helium-cooled ion drift tube. Over most of the temperature range the threebody reaction rate coefficients show an inverse temperature dependence proportional to Tsup(-n) with n in the range 0.6 to 2.9. This temperature dependence is quite consistent with current theories of ion molecule association. At low temperatures, however, a deviation from the Tsup(-n) dependence was observed for the association reactions (ii). For reactions (i) different temperature dependences were obtained for N_2 and He third bodies indicating an additional temperature dependence of the collisional stabilisation process. (Authors).

31927 (INIS-mf—8968, pp 164-169) **Drift tube measurements of the temperature dependence of ion association reactions in atmospheric gases. Product ion yields of reactions in methane.** Johnsen, R.; Dheandhanoo, S.; Biondi, M.A. (Pittsburgh Univ., PA (USA). Dept. of Physics and Astronomy). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Association reactions of NO^+, O_2^+, N^+, and N_2^+ ions with N_2 and CO_2 have been studied as a function of gas temperature using a variable-temperature drift-tube mass-spectrometer apparatus. The observed variation of the forward rate coefficients with temperature (typically 100 K - 400 K) can be expressed in the form of power laws of the form k = C(T/300)sup(x), with x ranging from 2.2 to 4.3. In a second set of measurements, we have employed a selected ion drift apparatus (SIDA) to determine product ion yields for several fast reactions of H^+, D^+, and N^+ ions with methane. It is found that the product ion yields exhibit a pronounced variation with ion energy (0.04 - 0.2 eV in the lab frame), even though the total rate coefficients are independent of energy. Generally, charge transfer branches are found to dominate over rearrangement reaction as the ion energy is increased. (Authors).

31928 (INIS-mf—8968, pp 170-173) **Ion-molecule reactions at low temperatures.** Nigel, G.; Smith, A.; Smith, D. (Birmingham Univ. (UK)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Studies performed by the Birmingham group since 1979 are reviewed. They include ion association reactions and isotope exchange reactions. A more detailed account of this work is given in other papers of the same seminar and elsewhere.

31929 (INIS-mf—8968, pp 174-179) **Population of nearly resonant Xesup(+*) states by charge transfer excitation from He^+ as studied spectroscopically in a flow drift tube (energy range: 0.04 - 2 eV; wavelength region: 584 - 1470 A).** Federer, W.; Kuen, I.; Lindinger, W.; Dobler, W.; Howorka, F. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Charge transfer excitation in collisions of helium ions with xenon atoms as seen in the spectra of visible emitted photons have been studied in the flow drift tube in the range 0.04 - 2 eV. A formula is given on the number of photons emitted as a consequence of the excitation of a specific state. The absolute cross sections for the charge exchange excitation for the states are listed. Values of rate constants and the ground-state Xe^+ ions after exchange is also given.

31930 (INIS-mf—8968, pp 180-184) **Determination of resonant charge transfer cross sections by drift tube techniques.** Elford, M.T. (Australian National Univ., Canberra. Research School of Physical Sciences); Williams, O.M. (Defence Research Establishment, Salisbury (Australia)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The measurement of charge transfer cross sections for the reactions $A^+ + A \rightarrow A + A^+$ by beam techniques becomes very difficult at ion energies below about 1 eV and considerable effort has been applied to deriving such cross sections by the use of ion swarm techniques. Although a wide variety of swarm methods has been used to obtain reaction rates for charge transfer (e.g. flowing afterglow and selected ion-flow tube systems) this discussion will be restricted to two swarm methods which employ drift tubes. These methods are the injected ion technique of Kaneko et al. which has been used extensively at the Tokyo Metropolitan University and a method based on the analysis of mobility data using Skullerud's drift velocity formula which has been employed at the Australian National University. The purpose of this brief review is to compare the two techniques and to describe some recent developments in ion mobility measurements at very high E/N (> 1000 Td). Particular attention is paid to Kr^+ ions in Kr because of recent experimental interest in this case.(Author).

31931 (INIS-mf—8968, pp 186-190) **Method to study reactions between ions and atomic hydrogen in a quasistatic drift tube.** Tosi, P.; Ianotta, S.; Bassi, D. (Trento Univ. (Italy). Dept.of Physics); Villinger, H.; Dobler, W.; Lindinger, W. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The rate coefficients for the reactions of a primary ion A^+ with H_2 and H are obtained respectively by comparision of the declines of the primary ion signal $i(A^+)$ and the rises of a product ion signal $i(B^+)$ once with the addition of H_2 allone and a second time of a mixture of H_2 and H to the buffer gas in a drift experiment, performed at IRST, Trento. The method is demonstrated using the reactions of CO_2^+ with H_2 and H.

31932 (INIS-mf—8968, pp 191-195) **Reactions of CO_2^+ and CH_5^+ with atomic hydrogen studied in a flow drift experiment.** Federer, W.; Dobler, W.; Ramler, H.; Lindinger, W. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik); Tosi, P.; Bassi, D. (Trento Univ. (Italy). Dept.of Physics). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The reactions of CO_2^+ and CH_5^+ with atomic hydrogen have been investigated in a SIFDT, and rate coefficients of ksub(CO_2^+) = 3 X 10^{-10} cm^3 sec^{-1} and ksub(CH_5^+) = 1.5 X 10^{-10} cm^3 sec^{-1} have been obtained.

31933 (INIS-mf—8968, pp 196-200) **Vibrational relaxation of NO^+ (v=3,2,1) by various neutrals.** Dobler, W.; Federer, W.; Howorka, F.; Durup-Ferguson, M.; Lindinger, W. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik); Ferguson, E.E. (Paris-11 Univ., 91 - Orsay (France)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The quenching of state selected NO^+(v=3,2,1) by various neutrals has been investigated in a SIFDT in the energy range from thermal to about 1 eV, KEsub(cm). With a few exceptions, the quenching rate coefficients decline with increasing KEsub(cm), indicating complex formation. The quenching rate coefficients increase strongly with increasing polarizability of the neutrals, however the rare gases do not fit into this pattern.

31934 (INIS-mf—8968, pp 201-207) **Transverse diffusion of mass-identified ions in their parent gases.** Sejkora, G.; Bryant, H.C. (Univ.of New Mexico, Albuquerque, USA); Girstmair, P.; Hesche, M.; Maerk, T.D. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik); Djuric, N. (Inst.of Physics, 11001 Belgrad, YU). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Measurements, recently completed and in progress, of the transverse diffusion of He^+, Ne^+, Ne^{2+}, Ar^+,Ar^{2+}, N_2^+, N_4^+ in their parent gases, determined by directly sensing the mass-identified ions, for E/N values ranging from 20 to 200 Td, will be presented. The experimental design and analysis will be described, and theoretical implications of the measurements will be discussed.

31935 (INIS-mf—8968, pp 208-211) **Energy distributions of N^+ ions drifting in helium.** Fhadil, H.A.; Numan, A.T.; Shuttleworth, T.; Hasted, J.B. (University Coll., London (UK). Dept. of Physics). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

A cylindrical 127deg momentum analyzer is used to measure energy distributions of ions effusing at THETA = 0deg from an axial orifice in a drift tube into which mass-separated ions from a radiofrequency ion source are injected at 30 eV energy and allowed to thermalize in a noble gas in the pressure range 0.25 - 1 Torr. The variations of width and asymmetry of measured energy distributions with reduced field E/n for the mass 14 N^+ are presented. No evidence of metastable ions is found. Assuming the Wannier equation drift velocities are calculated and compared with previous mobility data.

31936 (INIS-mf—8968, pp 212-217) **Calculation of ion drift and diffusion: basis set expansions with non-gaussian weight functions.** Skullerud, H.R. (Inst.of Technology, N7034 Trondheim, Norway). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Drift velocities and diffusion coefficients can often be calculated to a high precision from the Boltzmann equation by using polynomial basis set expansions with suitably chosen Gaussian weight functions. In E/N-regions where the mobility increases with E/N, convergence problems do sometimes occur, and this impairs the prospects of obtaining accurate interaction potentials from an inversion of transport data. In the present paper we first discuss the convergence properties of (isotropic) Gaussian weight basis set expansions, and illustrate the discussion with a simple one-dimensional model calcuation. We then sketch a non-Gaussian weight basis set expansion method, which to some extent overcomes the convergence problems mentioned. Matrix elements of the collision operator are calculated from cold gas expressions with a convolution type temperature expansion, a scheme which is best suited for light ion calculations. As an example, calculations for Li^+ ions in Ar are presented.

31937 (INIS-mf—8968, pp 218-221) **Some aspects of negative differential conductivity in gases.** Petrovic, Z.L.; Crompton, R.W. (Australian National Univ., Canberra. Centre for Resource and Environmental Studies); Haddad, G.N. (National Measurement Laboratory, CSIRO, Lindfield, N.S.W.). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Negative differential conductivity (NDC) has usually been observed in gases (e.g. CH_4) or gas mixtures (e.g. Ar-N_2 and Ar-CO) in which the thresholds for vibrational excitation (epsilon sup(T)) approximately coincide with the Ramsauer-Townsend minimum in the momentum transfer cross section (sigma sub(m)). Consequently such a combination of cross sections is frequently taken as a necessary condition for NDC to occur. The aim of our paper is to provide a simple conceptual explanation of the phenomenon through insights provided by a series of model calculations, and to point out which features of the elastic and inelastic cross sections lead to its occurrence.

31938 (INIS-mf—8968, pp 222-226) **Mobility of Li^+ and K^+ ions in helium and argon at 294 and 80 K and derived interaction potentials.** Cassidy, R.A.; Elford, M.T. (Research School of Physical Sciences, (Australia) National University, Canberra, Australia). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The analysis of mobility data is a valuable technique for deriving ion-atom interaction potentials or testing at initio potentials particularly at relatively large internuclear separations. In order to obtain the most complete information on the long range part of the potential it is necessary to have mobility data at sufficiently low gas temperatures and small values of E/N that the mobility is determined only by the dipole polarization force. Although this condition can be reasonably well met at room temperature for gases of high polarizability, this is not the case for ions in helium and in particular for the most well studied case, that of Li^+ in helium. The prime purpose of the present measurements was to obtain low temperature data for Li^+ in helium in order to determine more accurately the attractive long range tail of the potential. The measurements were also extended to argon to demonstrate the effect of the polarizability on the derivation of potentials. The mobility measurements were made using a drift tube-mass spectrometer system employing the Bradbury-Nielsen time of flight technique. Measurements were performed at 294 K and 80 K. The 'three temperature' theory of Lin, Viehland and Mason was used to fit interaction potentials to the present data. Detailed comparisons are made here only for the case of Li^+ ions in helium. The new data for 80 K provide additional information on the potential at internuclear separations which cover the range to 5 A.

31939 (INIS-mf—8968, pp 227-232) **Diffusion of lithium ions in argon.** Stefansson, T. (Department of Physics, Norwegian Institute of Technology, N-7034 Trondheim-NTH, Norway). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Published measurements of transport coefficients for Li^+ ions in argon seem to be limited to the mobility and the longitudinal diffusion coefficient in the field-to-density ratio range at and below 200 Td^{1-5}. In this paper results are presented from measurements of the transverse diffusion coefficient to mobility ratio (Dsub(T)/μ) for Li^+ ions in argon in the field-to-density ratio range $10 < E/n < 800$ Td. The measurements were made with a drift tube mass spectrometer at a gas temperature of 295 +- 1 K using the modified Townsend method of Skullerud. The experimental curve is compared to a calculation by H.R. Skullerud in the same proceedings.

31940 (INIS-mf—8968, pp 233-240) **Studies of ions in a drift field: laser diagnostics of excited states and measurements of thermochemical properties at equilibrium.** Castleman, A.W.; Keesee, J.; Keesee, R.G. (Pennsylvania state University, Department of Chemistry, University Park, PA 16802). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

A major technique for investigating the thermochemical properties of ions and their related clusters is the high pressure drift/mass spectrometer detection technique which has been utilized in our laboratory for a number of years and has provided extensive information on the bonding of various polar and nonpolar molecules to ions, with concomitant information being attained on the depth of the well of interaction between ions and molecules, and related inferences concerning the structure of these stable gas-phase complexes. A crucial question in this regard is the extent to which ions drifting in an electric field are thermalized, thereby attaining a Boltzmann distribution from which thermochemical properties can be derived.

31941 (INIS-mf—8968, pp 153-157) **Internal energy of N_4^+ drifting in N_2 and He.** Lindinger, W.; Villinger, H.; Saxer, A.; Ramler, H.; Richter, R. (Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Comparison of the rate coefficients for the reaction of N_4^+ with H_2 obtained in drift experiments both in a He and N_2 buffer show the same dependence when plotted as a function of Tsub(i) = KEsub(cm) . 2/(3k) being the collision induced internal temperature according to Viehland et al. This dependence is nearly identical to the one obtained as a function of real temperature, T, in the

NOAA-Laboratory at Boulder, showing that N_4^+ is readiliy internally excited not only by the heavy buffer N_2 but also by the light He buffer gas.

31942 (INIS-mf—8968, pp 1-4) **Studies of plasma processes using a flowing afterglow/langmuir probe (FALP) apparatus.** Smith, D.; Adams, N.G.; Alge, E. (Birmingham Univ. (UK)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

With the flowing afterglow/langmuir probe (FALP) apparatus it is possible to determine: spatial variations in electron density nsub(e), positive and negative ion densities n^+ and n^- and the electron temperature Tsub(e) in afterglow plasmas. Several applications, mostly carried out by the authors, e.g. measurement of dissociative recombination coefficient αsub(t), electron attachment coefficients β and studies of binary ionic recombination are outlined. More detailed accounts of these investigations are given in other papers of the authors in the same seminar.

31943 (INIS-mf—8968, pp 5-8) **Measurements of the dissociative recombination coefficients for O_2^+, NH_4^+, H_3O^+ and NO^+ at thermal energies.** Alge, E.; Adams, N.G.; Smith, D. (Birmingham Univ. (UK)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The dissociative recombination reactions with electrons of O_2^+, NH_4^+,NO^+ and H_3O^+ have been studied under truly thermalised conditions over the temperature range 200-600 K using a flowing afterglow/Langmuir probe apparatus. The recombination coefficents, αsub(t), for O_2^+, NH_4^+ and NO^+ were found to vary as: $1.95x10^{-7}$ (300/T)sup(0.7), $1.35x10^{-6}$ (300/T)sup(0.6) and $4.0x10^{-7}$ (300/T)sup(0.9) cm^3s^{-1} respectively; no significant variation with temperature was found for αsub(t)(H_3O^+) = $1.0x10^{-6}$ cm^3s^{-1}.

31944 (INIS-mf—8968, pp 9-11) **Cluster ion-electron recombination measurements: the trimer ion Ne_3^+.** Macdonald, J.A.; Biondi, M.A.; Johnsen, R. (Pittsburgh Univ., PA (USA). Dept. of Physics and Astronomy). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The value of the effective recombination coefficient of the trimer has been determined over the range of electron temperatures 80 deg K < Tsub(e) < 5000 deg K, at Tsub(+) = Tsub(n) = 80 deg K.

31945 (INIS-mf—8968, pp 12-23) **Electron-molecule interactions in gases and liquids: the electron attachment process in gases and nonpolar liquids.** Christophorou, L.G. (Tennessee Univ., Knoxville (USA). Dept. of Physics); Siomos, K. (Oak Ridge National Lab., TN (USA)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

In this paper we discuss briefly the nature of electron attachment processes in nonpolar liquids, the effect of the attaching gas molecule itself and the electron state on the attachment rate constant, and the relation of electron attachment processes in nonpolar liquids to those in gases.

31946 (INIS-mf—8968, pp 24-29) **Thermal electron attachment to Van der Waals molecules.** Toriumi, M.; Suzuki, E.; Hatano, Y. (Tokyo Inst. of Tech. (Japan)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Using a microwave conductivity technique with pulse radiolysis, thermal electron attachment in O_2-C_2H_6 and O_2-C_2H_4 mixtures is studied at various temperatures (-120 - 100 deg C) and third-body densities ($5x10^{17}$ - $3x10^{19}$ molecules.cm^{-3}). Van der Waals(vdW) molecules (O_2.M), where M is a third-body molecule, are clearly shown to contribute to electron attachment even at low densities of M. A large rate constant value for the initial electron attachment to vdW molecules ($O_2.C_2H_6$) and ($O_2.C_2H_4$), k_s = (1.9sup(+1.0)sub(-0.6))$x10^{-4}$Tsup(-1.5) exp(-(3.5+-0.6)$x10^2$/T) cm^3.$molecules^{-1}$.s^{-1} and (1.1+-0.2)$x10^{-4}$Tsup(-1.5) exp (-(5.2+-0.6)$x10^2$/T) cm^3.$molecules^{-1}$.s^{-1}, respectively where T is the absolute temperature, is elucidated by a smaller resonance energy, (30+-5) meV for ($O_2.C_2H_6$) and (45+-5) meV for ($O_2.C_2H_4$), as compared with that of an isolated oxygen molecule and by a larger resonance with (450+-250sub(-150)) μeV for ($O_2.C_2H_6$) and (270+-50) μeV for ($O_2.C_2H_4$). The combination of Bloch/Bradbury mechanism and a vdW molecule mechanism can elucidate experimental data by swarm experiments at higher density of M upto approximately $3.5x10^{20}$ molecules.cm^{-3}.

31947 (INIS-mf—8968, pp 30-36) **Electron drift velocity and ionization and attachment coefficients in gases/mixtures for diffuse-discharge opening switches.** Carter, J.G. (Oak Ridge National Lab., TN (USA)); Hunter, S.R.; Christophorou, L.G.; Lakdawala, V.K. (Tennessee Univ., Knoxville (USA). Dept. of Physics). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

There has been increasing interest in recent years in the possibility of using inductive energy storage devices as a means of storing and rapidly transferring energy in numerous pulsed-power applications. A primary requirement for this type of energy storage system is a switch capable of being repetitively opened (lifetime $>10^5$ shots) on a very short-time scale (of the order of a few nanoseconds) and being able to withstand high voltages ($>10^5$ volts) during the opening stage without breakdown. A leading contender for this type of switch is an externally sustained diffuse gas discharge operating at gas pressures of one to several atmospheres and externally sustained by pulsed electron beams (e-beams) or by resonant ionization processes of the gaseous medium using a high-power laser. The data presented in this paper show that it is possible to find gases and gas mixtures which have the desirable drift velocity, electron attachement, and breakdown strength characteristics required for diffuse-discharge opening switch applications. Several such gases and gas mixtures have been identified and their approximate operating conditions have been indicated.

31948 (INIS-mf—8968, pp 37-41) **Temperature and pressure dependence of the nondissociative electron attachment to perfluoropropylene (1-C_3F_6).** McCorkle, D.L. (Tennessee Univ., Knoxville (USA). Dept. of Physics and Astronomy); Christophorou, L.G.; Hunter, S.R. (Oak Ridge National Lab., TN (USA)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Earlier investigations of electron attachment to 1-C_3F_6 in dilute gas mixtures of 1-C_3F_6 with the buffer gases N_2 and Ar have shown an anomalous dependence of the electron attachment rate constant, ksub(a), for 1-C_3F_6 on both the buffer, Nsub(B), and attaching, Nsub(A), gas number density. These studies also showed that the ksub(a) decreases significantly with increasing temperature T (300-473K). These findings, as well as additional measurements of ksub(a)(T) at T<300K, are presented and discussed in this paper. A mechanism of electron attachment to 1-C_3F_6 below 2eV is proposed.

31949 (INIS-mf—8968, pp 109-114) **Temperature dependence of the de-excitation rate constants of excited rare gas atoms by atoms and molecules.** Koizumi, H.; Ukai, M.; Tanaka, Y.; Shinsaka, K.; Hatano, Y. (Tokyo Inst. of Tech. (Japan)). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

The temperature dependence of the de-excitation rate constants of He(2^3S) by M(M=N_2, CO, Ar, Kr, NO, O_2, C_2H_4, and

CO_2) and $Ar(^1P_1)$ and $Ar(^3P_1)$ by SF_6 and N_2 have been measured using a pulse radiolysis method to give the collision energy dependence of the cross sections of these processes. The results of $He(2^3S)$ show that a larger de-excitation probability corresponds to a larger interaction radius of the transition from the state of $He(2^3S)$-M to that of He-($M^+ + e^-$). The results of $Ar(^1P_1)$ and $Ar(^3P_1)$ show that a long-range dipole-dipole interaction and a short-range interaction are important in the de-excitation processes of $Ar(^1P_1)$-SF_6 and $Ar(^3P_1)$-SF_6 and in those of $Ar(^1P_1)$-N_2 and $Ar(^3P_1)$-N_2, respectively. (Authors).

31950 (INIS-SU—202, pp 208-214) **Physical principles and design of the ATOS device.** Sokolov, N.I.; Tereshkina, L.G.; Khlopkin, A.N.; Shurov, O.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1982. (In Russian). NTIS (US Sales Only), PC A23/MF A01. Order Number TI84780274. (CONF-8106209—Vol.1).

From 2. all-union conference on engineering problems of thermonuclear reactors; Leningrad, USSR (23 Jun 1981).

Structural specific features and physical principles of the ATOS experimental device operation are described. ATOS is meant for performing complex investigations of pair collisions of heavy atomic particles (atoms, ions, molecules, chemical radicals) leading to variation of their mass and charged states. The plant can be used to study the interactions of impure element multicharged ions of a thermonuclear plasma with its basic components. The ATOS device is based on the principle of joined running up beams. ATOS consists of two independent parts: ATOS-1 and ATOS-2. ATOS-1 comprises neutral particles channel with HF ion source and a measurment chamber, containing systems of beam combining and analysis of their mass and charged composition of the beam channel of multicharged ions with gas discharge ion source. The magnet-monochromator structure in the neutral particles beam channel permits to separate single-charged ions at 5 keV up to 182 at. un. mass, while at 1 keV-up to 910 at.un. The neutral particles maximum energy in collisions equals 40 keV. Maximum ion energy in the channel constitutes 20 keV.

31951 (JINR-R—4-83-498) **Two-center problem of quantum mechanics. Pt. 9. Calculation algorithm of matrix elements with m not equal to 0.** Vinitskij, S.I.; Ponomarev, L.I.; Puzynina, T.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1983. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701771.

An algorithm is given for the calculation of matrix elements of the kinetic energy operator and the momentum of relative motion of nuclei in the body system with a Coulomb interaction between states im and jm' with $mhm'=0$ and $m'=m=+-1$ of the discrete spectrum of tMe two-center problem of quantum mechanics (m is the azimuthal quantum number). Tables contain the expansion terms of the wave functions of the two-center problem at different R(R is the distance between nuclei) for states 1 s σ g, 2 p σ u, 2 pπu, 3 dπg, which are to be used to calculate the matrix elements within accuracy approximately 10^{-8}-10^{-7}.

31952 (LA-UR—84-1424) **Resonances in electron-molecule scattering and photoionization.** Schneider, B.I.; Collins, L.A. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 20p. (CONF-8405177—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012660.

From American Physical Society Division of Electron and Atomic Physics conference; Storrs, CT, USA (29 May 1984).

The development of reliable theoretical models for calculating the decay of quasi-stationary states of molecular systems has become an important endeavor for theoretical chemists. The understanding and analysis of a wide variety of physical and chemical phenomena depend on a knowledge of the behavior of these states in both collisional and photoionization problems. In this article we describe the theory and calculation of these cross sections using our Linear Algebraic/Optical Potential method. The theory makes optimal use of the numerical methods developed to solve large sets of coupled integral equations and the bound state techniques used by quantum chemists. Calculations are presented for a representative class of diatomic and triatomic molecules at varying levels of sophistication and for collisional and photoionization cross sections. 48 references, 11 figures.

31953 (LA-UR—84-1734) **Chaos and multiple photon absorption.** Ackerhalt, J.; Milonni, P.W. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 8p. (CONF-8406125—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012577.

From Army research workshop on chaos and nonlinear systems; Durham, NC, USA (15 Jun 1984).

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An anharmonic vibrational mode of a molecule, driven by an intense infrared laser and coupled to a quasi-continuum of background modes, is found to undergo chaotic oscillations. This chaos leads to predominantly fluence-dependent rather than intensity-dependent multiple-photon absorption, as is found experimentally. The loss of coherence is associated with the decay of temporal correlation of background-mode oscillations.

31954 (LBL—17611) **Quantum Monte Carlo study of the classical barrier height for the H + H_2 exchange reaction: restricted VERSUS unrestricted trial functions.** Reynolds, P.J.; Barnett, R.N.; Lester, W.A. Jr. (Lawrence Berkeley Lab., CA (USA)). Mar 1984. Contract AC03-76SF00098. 21p. (CONF-8403124—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012166.

From Sanibel symposia; Palm Coast, FL, USA (1 Mar 1984).

The fixed-node quantum Monte Carlo (QMC) method is used to obtain the classical barrier height for the H + H_2 exchange reaction. With a spin-restricted, single determinant trial function psi/sub T/ the reaction barrier E/sub b/ is less than 9.69 +- 0.25 kcal/mole. This mean value is below the calculated energy barrier obtained by Liu in the most extensive CI calculations on this system. Furthermore, the QMC saddle point energy of -1.6590 +- 0.00040 hartrees at the CI-determined geometry lies 0.00027 a.u. (0.17 kcal/mole) below Liu's best CI value. Finally, spin-restricted and spin-unrestricted single determinant trial functions are contrasted. Although the variational energy <psi/sub T/vertical bar H vertical bar psi/sub T/> for an SCF psi/sub T/ must be lower for the unrestricted case, this is not true generally for QMC. In fact, it is shown that if the unrestricted SCF psi/sub T/ has the lower QMC energy, then there exists another spin-restricted, single-determinant psi/sub T/ whose QMC energy is lower than the QMC energy of the spin-restricted SCF psi/sub T/.

31955 (LBL—17759) **Charge-changing collisions.** Schlachter, A.S. (Lawrence Berkeley Lab., CA (USA)). May 1984. Contract AC03-76SF00098. 9p. (CONF-8404143—6). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012317.

From 10. international conference on cyclotrons and their applications; East Lansing, MI, USA (30 Apr 1984).

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Recent results for charge-changing collisions of interest for cyclotrons and other particle accelerators are presented. Scaling rules, where available, are emphasized. 45 references, 11 figures.

31956 (LBL—17820) **Studies of surfaces using optical second-harmonic generation.** Tom, H.W.K. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 156p. NTIS, PC A08/MF A01; GPO Dep. Order Number DE84012306.

Thesis.

The experiments reported in this thesis demonstrate the use of second-harmonic generation (SHG) and sum-frequency generation (SFG) in reflection from surfaces to study various surface properties. The experiments firmly establish SHG as a viable new surface probe that complements existing surface probes in ultrahigh vacuum environments and is in many ways unique for studying interfaces between dense media. Surface structural symmetry can be revealed through the anisotropy in the SH signal from the surface as the sample is rotated about its normal. The form of this anisotropy is derived in theory and verified with an experiment on the Si(100) and (111) surfaces. The SHG and SFG signals from molecules adsorbed on noninteracting substrates have a direct relationship to the number, average orientation, and spectroscopic proper-

ties of the molecules. The SH intensity was used to measure the isotherm for adsorption of p-nitrobenzoic acid from ethanolic solution to fused silica. Experiments performed on a strongly-interacting well-characterized Rh(111) surface in ultrahigh vacuum establish the sensitivity of the SH probe in corroboration with other surface probes. For the first time, the SH coverage-dependence was fit by theory in a quantitative way for the case of O-atom adsorption. The sensitivity of SH to adsorption at different sites was established for CO on top- and bridge-sites. SHG was shown to be surface specific in that the SHG from alkali metal surfaces originates from the first two monolayers. SH sensitivity to the adsorption of catalytically-important hydrocarbons and to chemical processes such as benzene dehydrogenation was also demonstrated. 122 references, 27 figures, 2 tables.

31957 **(PB—84-151877) Observation of energy level shifts of Rydberg atoms due to thermal fields. Final report.** Hollberg, L.; Hall, J.L. (National Bureau of Standards, Washington, DC (USA)). Oct 1983. 5p. Pub. in Proceedings of Int. Conf. Laser Spectroscopy (6th), Interlaken, Switzerland, June 27-July 1, 1983, p229-2321983.

The authors report the first observation of level shifts of Rydberg states due to their coupling with thermal radiation fields. The Rydberg level positions were measured relative to the atomic ground state using two photon optical Ramsey fringe techniques in an atomic beam apparatus. The level shifts were isolated by chopping the blackbody radiation source. The runs analyzed are consistent with the expected T sup 2 dependence and much data remains to be analyzed.

31958 **(PNL-SA—11768) Algorithm for secondary electron emission from water vapor by high velocity ions.** Wilson, W.E.; Miller, J.H. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1984. Contract AC06-76RL01830. 16p. (CONF-8403123—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011871.

From 32. annual scientific meeting of Radiation Research Society; Orlando, FL, USA (1 Mar 1984).

An algorithm is presented for calculating the cross section, differential in secondary electron energy, for ionization of water vapor by fast bare non-relativistic ions. The algorithm is based on Bethe-theory which describes inelastic scattering as a sum of glancing and hard collisions. Published data were employed to evaluate the two components. The algorithm is written in FORTRAN-77.

31959 **(TRI-PP—82-22) μi charge exchange and muonium formation in low pressure gases.** Fleming, D.G.; Mikula, R.J.; Garner, D.M. (TRIUMF, Vancouver, British Columbia (Canada)). Apr 1982. 36p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701806.

Using the basic muon spin rotation technique, the fractions of energetic positive muons thermalizing in diamagnetic environments (fsub(μ)) or as the paramagnetic muonium atom (fsub(Mu)) have been measured in low pressure pure gases (He, Ne, Ar, Kr, Xe, H_2, N_2, NH_3, and CH_4) as well as in several gas mixtures (Ne/Xe, Ne/Ar, Ne/NH_3, Ne/CH_4). In the pure gases, the muonium fractions fsub(Mu) are generally found to be smaller than expected from analogous proton charge exchange studies, particularly in the molecular gases. This is probably due to hot atom reactions of muonium following the charge exchange regime. Comparisons with monium formation in condensed matter as well as positronium formation in gases are also presented. In the gas mixtures, the addition of only a few hundred ppm of a dopant gas, which is exothermic for muonium formation (e.g. Xe), gives rise to an fsub(Mu) characteristic of the pure dopant gas itself, demonstrating the importance of the neutralization process right down to thermal energies. In all cases, the experimental signal amplitudes are found to be strongly pressure dependent, which is interpreted in terms of the time spent by the muon as neutral muonium in the charge exchange regime: tsub(n) < 0.2 ns. This time is generally shorter in the case of molecular gases than in rare gases.

31960 **(TRI-PP—82-23) Spin depolarization in muonium by hydrated electrons.** Percival, P.W.; Brodovitch, J.C.; Newman, K.E. (TRIUMF, Vancouver, British Columbia (Canada)). Jun 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701808.

The missing fraction of muon polarization in water is shown to originate from encounters between muonium and hydrated electrons. This takes place at about 1 ns after the primary events in which muonium and hydrated electrons are born.

31961 **(TRI-PP—82-33) Evidence for anisotropic diffusion of Mu in ice and implications for H.** Percival, P.W.; Brodovitch, J-C.; Newman, K.E.; Spencer, D.P. (TRIUMF, Vancouver, British Columbia (Canada)). Sep 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701775.

Muonium has been studied in single crystals of H^2O and D^2O. Orientation dependent precession frequencies reveal anisotropy in the hyperfine tensor of muonium. The axial symmetry suggests that Mu atoms diffuse preferentially along the c-axis channels of the ice lattice. H is expected to behave the same way.

31962 **(TRI-PP—82-49) Muonium atoms in liquid and solid neopentane.** Ng, B.W.; Stadlbauer, J.M.; Jean, Y.C.; Walker, D.C. (TRIUMF, Vancouver, British Columbia (Canada)). Oct 1982. 4p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701772.

Relatively long-lived muonium atoms have been observed in neopentane (2,2-dimethylpropane). The yields of all muon states are found to be essentially the same in liquid and solid neopentane and the same as those in water. These results have bearings on three matters of current interest in muonium chemistry: the origin of the 'background' spin relaxation; the formation mechanisms; and the change in yields at the liquid-solid phase transition. These data were obtained by the μSR technique (muon spin rotation) at the TRIUMF accelerator.

31963 **(TRI-PP—82-50) Muonium addition to cyanides.** Stadlbauer, J.M.; Ng, B.W.; Jean, Y.C.; Walker, D.C. (TRIUMF, Vancouver, British Columbia (Canada)). Oct 1982. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701776.

Muonium, the light radioactive isotope of hydrogen, was found to add to the CN triple bond of acetonitrile, cyanoacetate, cyanide and tetracyanocadmate(II) with room temperature rate constants, K sub(M), of 5.1×10^7, 7.7×10^7, 3.0×10^9, and 1.7×10^{10} (all $M^{-1}s^{-1}$), respectively. While $Cd(CN)_4^{-2}$ is diffusion controlled with an activation energy of approximately 15 kJ/mole the others appear to be activation controlled as with cyanoacetate's activation barrier of approximately 35 kJ/mole. Kinetic isotope effects range from 0.7 to 24.

31964 **(TRI-PP—82-51) Spin-conversion reaction of muonium with nickel cyclam.** Stadlbauer, J.M.; Ng, B.W.; Jean, Y.C.; Walker, D.C. (TRIUMF, Vancouver, British Columbia (Canada)). Dec 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701777.

Muonium atoms in aqueous solution were made to interact with nickel cyclam in two spin states, interchanged merely by altering the ionic strength of the solution by addition of an inert salt. The results show that 'triplet' muonium interacts with the paramagnetic ion (octahedral coordination) at about the diffusion-limited rate (2×10^{10} M^{-1} s^{-1}), but with the diamagnetic ion (square planar coordination only) about 100-fold slower. This strongly implies that the interaction with the paramagnetic state is an electron spin-conversion (either spin-exchange or spin-flip). It demonstrates the potential of using the 'triplet' to 'singlet' conversion of muonium, as followed by the muon spin rotation technique (μSR), as a probe of paramagnetism and as a monitor of spin-exchange interactions.

31965 **(UWThPh—83-19) Thomas-Fermi-Von Weizsaecker and Hartree energies as functions of the degree of ionization.** Baumgartner, B. (Vienna Univ. (Austria)). 1982. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701770.

The properties of Thomas-Fermi-von Weizsaecker energies as functions of the degree of ionization are studied. A concavity result is established, which can be interpreted as a bound to the decrease of the ionization energies. A numerical calculation of Har-

tree energies is described and the critical ionization is numerically calculated as 1.21.

31966 **Collisional energy transfer in the low-pressure-limit unimolecular dissociation of HO_2.** Brown, N.J.; Miller, J.A. (Applied Science Division, Lawrence Berkeley Laboratory, Berkeley, California 94720). *Journal of Chemical Physics;* **80**: No. 11, 5568-5580(1 Jun 1984).

Classical trajectory calculations are used to investigate the energy transfer properties of HO_2—He collisions under conditions where HO_2 is initially excited to energies near dissociation. The emphasis in this investigation is on determining the dependence of vibrational energy transfer characteristics on heat bath temperature, total molecular energy, and total molecular angular momentum. Vibrational energy transfer is a function of all three variables. Energy transfer averages, correlation coefficients, and energy transfer cross sections are used to determine the energy transfer mechanism. Evidence is found for all types of energy transfer, but the specific mechanism for a particular ensemble is highly dependent on the initial variables. At fixed vibrational energy and heat bath temperature, the magnitude of the average vibrational energy transferred per collision '$<\Delta E'>$' increases with increasing molecular angular momentum. At fixed initial molecular angular momentum and heat bath temperature, -$<\Delta E'>$ increases as the total energy in the molecule increases, except for very low values of initial angular momentum. Increasing the heat bath temperature for fixed values of the other initial variables decreases the magnitude of $<\Delta E'>$. The relative importance of weak and strong collisions in governing the energy transfer characteristics is discussed. In particular, the probability density function for vibrational energy transfer is not well represented by a simple "exponential down" model. A double exponential function is required to represent the long tail of the distribution adequately.

31967 **Electron impact spectroscopy of methane and methane—d_4.** Dillon, M.A.; Wang, R.; Spence, D. (Argonne National Laboratory, Argonne, Illinois 60439). *Journal of Chemical Physics;* **80**: No. 11, 5581-5588(1 Jun 1984). Contract W-31-109-ENG-38.

Electron impact spectra of methane and methane-d_4 have been obtained employing electrons of 200 eV incident energy at scattering angles of 2° to 15° over an energy-loss range that includes the second ionization potential. In the bound state spectrum evidence is presented for the existence of at least one additional state in the region of the 3s transition. A new vibrational progression has been found on the side of a conjectured 4s band lending support to that assignment. One diffuse structure and three new optically forbidden vibrational progressions have been found in a 4 eV range below the $^2A_1$ ion threshold. Evidence indicates that the first three transitions belong to the symmetry forbidden Rydberg series $(2a_1, ns)\leftarrow(2a_1)^2$ where n = 3, 4, and 5. It is suggested that the fourth transition is the first member of a series converging to an excited ion state.

31968 **Differential cross sections for ionization of methane, ammonia, and water vapor by high velocity ions.** Wilson, W.E.; Miller, J.H.; Toburen, L.H.; Manson, S.T. (Radiological Physics Section, Pacific Northwest Laboratory, Richland, Washington 99352). *Journal of Chemical Physics;* **80**: No. 11, 5631-5638(1 Jun 1984).

Cross sections, differential in the energy of secondary electrons, for ionization of methane, ammonia, and water vapor by high energy protons are presented. The results are based on a model that uses photoabsorption and ion impact ionization data to evaluate the coefficients in Bethe's asymptotic cross section for inelastic scattering of high velocity ions. Model cross sections are compared with previously published data and new data on ionization of methane and water vapor by 3.0 and 4.2 MeV protons. The simple, analytic model should be very useful in transport calculations where differential ionization cross sections over a broad range of primary and secondary energies are needed.

31969 **Systematic GVB study of harmonic vibrational frequencies and dipole moment derivatives: The vinyl radical C_2H_3 and other simple molecules.** Dupuis, M.; Wendoloski, J.J. (National Resource for Computation in Chemistry, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Journal of Chemical Physics;* **80**: No. 11, 5696-5702(1 Jun 1984). Contract AC03-76SF00098.

Structure, harmonic vibrational frequencies, and dipole moment derivatives of methane, ethylene, and acetylene have been obtained from generalized valence bond (GVB) wave function calculations. The results are compared to Hartree—Fock (HF) data, and other correlated wave function data. It is found that the GVB method consistently overemphasizes left—right electron correlation effects, and predicts bond lengths ~0.01—0.02 A longer than experiment. However, the calculated harmonic frequencies are within 4.2% of the observed fundamentals and within 3.5% of the experimental harmonic frequencies. Dipole moment derivatives are in semi-quantitative agreement with experiment. The method is used to predict the IR spectrum of the vinyl radical, including a very intense out of plane bending mode with frequency near 1000 cm^{-1}.

31970 **Application of the semiclassical perturbation approximation to scattering from surfaces. Generalization to include phonon inelasticity.** Hubbard, L.M.; Miller, W.H. (Department of Chemistry and Materials and Molecular Research Division of the Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Journal of Chemical Physics;* **80**: No. 11, 5827-5831(1 Jun 1984).

The semiclassical perturbation (SCP) approximation of Miller and Smith is applied to the inelastic scattering of atoms from solid surfaces. Earlier applications of this approach have been to diffraction (i.e., elastic scattering) of He from LiF and to diffraction and rotationally inelastic scattering of H_2 from LiF, and the present work is an extension which allows for motion of the surfaces atoms (and thus phonon inelasticity). Therefore, phenomena that involve energy transfer between the surface and gas molecules can be described. In the present work sticking probabilities are calculated for He—W(110) and Ne—W(110), and the results show that a simple model such as this one can be quite useful in predicting energy transfer in gas—solid scattering systems.

31971 **Total and orbital SCF energies in molecules.** Schaad, L.J.; Hess, B.A. Jr.; Schwartz, M.E. (Department of Chemistry, Vanderbilt University, Nashville, Tennessee 37235). *Journal of Chemical Physics;* **80**: No. 11, 5861-5862(1 Jun 1984).

Results of extensive calculations are given for the SCF electronic energy in molecules. The total SCF energies were calculated with the 3-21G basis set.

31972 **Alpha-particle-induced, inner-shell ionization measurements for the undergraduate laboratory.** Desmarais, D.; Duggan, J.L. (University of Alberta, Edmonton, Canada T6C 4G9). *American Journal of Physics;* **52**: No. 6, 507-513(Jun 1984).

The interaction of α particles with low atomic number elements has been studied in an attempt to determine the inner-shell ionization cross section. These cross sections were determined by measuring the characteristic x rays that were produced when a thin aluminum target was bombarded by α particles from a 48-MBq ^{234}Cm α source. The x rays were detected with a Si(Li) x-ray detector whose resolution was 190 eV at 5.9 keV. The efficiency of the detector was determined from standard radioactive sources. The energies of the α particles were varied by placing thin Mylar absorbers between the α source and the target. The results are favorably compared to a current ionization theory given in such a form that an undergraduate physics major can do the calculations. This experiment is intended as an undergraduate laboratory experiment in the atomic or nuclear area.

31973 **Self-consistent time-dependent, Hartree-Fock calculation for a reactive molecular collision.** Tiszauer, D.; Kulander, K.C. (Lawrence Livermore National Laboratory, Livermore, California 94550). *Physical Review [Section] A: General Physics;* **29**: No. 5, 2909-2911(May 1984).

We report the first calculations on a molecular collision system using a fully self-consistent time-dependent Hartree-Fock (TDHF) method. The nuclear motion is treated classically with the forces determined by the time propagating electronic charge density. The electronic state is generated using a finite-difference TDHF calculation. We present results including a typical reactive trajectory, a corresponding time evolution of the electronic energy, and density plots of the molecular wave function evolving through the collision.

31974 **Electron-impact double ionization of rare-gas ions.** Pindzola, M.S.; Griffin, D.C.; Bottcher, C.; Crandall, D.H.; Phaneuf, R.A.; Gregory, D.C. (Atomic Theory Group, Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review* [*Section*] *A: General Physics;* **29**: No. 4, 1749-1756(Apr 1984).

Cross sections for the removal of two electrons from rare-gas ions by single collisions with incident electrons have been both measured using crossed beams of ions and electrons, and calculated using Hartree-Fock distorted-wave theory. For initial ions Ar^{4+}, Kr^{4+}, and Xe^{4+} the measured peak cross sections are 1.4×10^{-18}, 6.5×10^{-18}, and 9.0×10^{-18} cm^2, respectively. These measurements confirm and extend the measurements of Mueller and Frodl and of Achenbach et al. Calculations were performed for the charge-state-4+ ions and for Xe^{+}, Xe^{2+}, and Xe^{3+}. Comparison of experiment and theory indicates that the double ionization of rare-gas ions is dominated by the indirect mechanism of inner-shell single ionization followed by autoionization. The distorted-wave calculations for the 4d ionization cross section of Xe/sup q/+ (q = 1 to 4) ions are strongly influenced by term dependence in the ejected-electron continuum, and by ground-state correlations.

31975 **Comparison of multiconfiguration Dirac-Fock and multiconfiguration relativistic random-phase-approximation transition-energy calculations in the beryllium isoelectronic sequence.** Frye, D.; Armstrong, L. Jr. (Department of Physics, The Johns Hopkins University, Baltimore, Maryland 21218). *Physical Review* [*Section*] *A: General Physics;* **29**: No. 4, 2220-2221(Apr 1984). Contract AC02-76ET53006.

Transition energies from the $^1S_0$ ground state to the $^1P_1$ and $^3P_1$ excited states in the beryllium isoelectronic sequence are calculated using standard multiconfiguration Dirac-Fock (MCDF) theory. These predictions are then compared to those of the multiconfiguration relativistic random-phase-approximation (MCRRPA) theory and with experiment.

31976 **Relativistically corrected Schroedinger equation with Coulomb interaction.** Friar, J.L.; Tomusiak, E.L. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *C: Nuclear Physics;* **29**: No. 4, 1537-1539(Apr 1984).

A simple alternative derivation of the S-wave eigenvalues of the relativistically corrected Schroedinger equation with a Coulomb interaction is presented. It illustrates the utility of Laplace transform methods. The pionic atom problem is discussed.

6404 Fluid Physics

31977 **(UTIAS—250) Dusty-gas shock tube.** Miura, H.; Glass, I.I. (Toronto Univ., Ontario (Canada). Inst. for Aerospace Studies). May 1981. 81p. NTIS (US Sales Only), MF A01. Order Number DE84901157.

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Analytical and numerical methods were used to investigate the flow induced by a shock wave in a shock-tube channel containing air laden with suspended small solid particles. Exact results ae given for the frozen and equilibrium shockwave properties as a function of diaphragm-pressure ratio and shock-wave Mach numbers. The driver contained air at high pressure. A modified random-choice method together with an operator-splitting technique show clearly both the decay of a discontinuous frozen shock wave and a contact discontinuity and the formation of a stationary shock structure and an effective contact front of finite thickness. The effects of particle diameter, particle-number density and diaphragm-pressure ratio on the transitional behavior of the flow are investigated in detail. The alteration of the flow properties due to the presence of particles is discussed in detail and compared with classical shock-tube flows. 20 references.

31978 **Long-time states of inverse cascades in the presence of a maximum length scale.** Hossain, M.; Matthaeus, W.H.; Montgomery, D. (College of William and Mary, Williamsburg, VA (USA). Dept. of Physics). *Journal of Plasma Physics;* **30**: 479-493(Dec 1983).

It is shown numerically, both for the two-dimensional Navier-Stokes (guiding-centre plasma) equations and for the two-dimensional magnetohydrodynamics, that the long-time asymptotic state in a forced inverse-cascade situation is one in which the spectrum is completely dominated by its own fundamental. The growth continues until the fundamental is dissipatively limited by its own dissipation rate.

6451 Particle Interactions And Properties - Experimental

REFER ALSO TO CITATION(S) 31557, 32013, 32013, 32074, 32114

31979 **(ANL-HEP-CP—84-19) Need to plan for a full-scale lns-physics program at the SSC.** White, A.R. (Argonne National Lab., IL (USA)). Mar 1984. Contract W-31-109-ENG-38. 6p. (CONF-840275—8). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011811.

From Workshop on anti pp options for the SSC; Chicago, IL, USA (13 Feb 1984).

Arguments for a full lns physics program at the SSC are enumerated and elaborated on. They are: first - the inadequacy of data from a minimal program, second - the potential fundamental significance of a high-energy soft physics collective phenomenon and third - the possible diffractive production of much of the interesting new physics that will be searched for.

31980 **(BNL—34316) Particle ratios at high transverse momentum in pp collisions at $\sqrt{s}$ = 63 GeV and correlations between high p/sub T/ identified charged particles and associated identified charged particles.** Akesson, T.; Albrow, M.G.; Almehed, S.; Batley, R.; Benary, O.; Boggild, H.; Botner, O.; Breuker, H.; Brody, H.; Burkert, V. (Brookhaven National Lab., Upton, NY (USA); Bonn Univ. (Germany, F.R.). Physikalisches Inst.; Cambridge Univ. (UK); European Organization for Nuclear Research, Geneva (Switzerland); Niels Bohr Inst., Copenhagen (Denmark); Lund Univ. (Sweden)). 1983. Contract AC02-76CH00016. 22p. (CONF-830718—31). NTIS, PC A02; 3; GPO Dep. Order Number DE84010512.

From International Europhysics conference on high energy physics; Brighton, UK (20 Jul 1983).

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The production of identified charged particles in pp collisions at $\sqrt{s}$ = 63 GeV with an identified high p/sub T/ trigger particle emitted in the central region is studied. The measurements were performed at the CERN ISR using the Axial Field Spectrometer. Trigger particle ratios, $\sigma(\pi^{+-})/\sigma(\text{all}^{+-})$, $\sigma(K^{+-})$ and $\sigma(p^{+-})/\sigma(\text{all}^{+-})$ are presented for p/sub T/ from 5 GeV/c to 8 GeV/c. In addition $\sigma(\pi^{+-})/\sigma(\text{all}^{+-})$ is presented in the p/sub T/ region from 2.5 GeV/c to 4.5 GeV/c. The charge compensation in the hemisphere containing the trigger particle is shown to depend strongly on the identity of the trigger particle and on the identity of the associated particles. 13 references.

31981 **(DOE/ER/40039—T1) High energy physics research at Texas A & M University. Annual progress report, January 1, 1983-December 31, 1983.** Webb, R.C. (Texas A and M Univ., College Station (USA). Dept. of Physics). 1984. Contract AS05-81ER40039. 30p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011616.

Portions are illegible in microfiche products.

During the past twelve months our group has made significant advances in both experiments with which we are involved. We present here an updata on our group's underground super heavy

magnetic monopole search and a report on the latest designs of the forward hadron calorimeter system which the TAMU group is to build for the Collider Detector Facility (CDF) at Fermilab. 16 references.

31982 **(FERMILAB-CONF—84/33-T) Search for neutral, penetrating, metastable particles produced in the SLAC beam dump.** Bjorken, J. (Fermi National Accelerator Lab., Batavia, IL (USA)). Mar 1984. Contract AC02-76CH03000. 13p. (CONF-840150—5). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012468.

From 4. Moriond workshop on massive neutrinos in particle and astro-physics; La Plagne, France (15 Jan 1984).

A search was made for neutral objects which might be produced by 20 GeV electrons incident on the SLAC beam dump, penetrate the downstream natural shielding, and decay upstream of an electromagnetic shower calorimeter. With about 30 coulombs of electrons dumped, no candidate events were found above an energy of $\sim$ 2 GeV. Preliminary analysis implies the 95% confidence level limit on the product of mass and lifetime of light axion-like bosons decaying primarily into two photons to be greater than 0.8 keV-sec. Preliminary limits on photino parameters are also given.

31983 **(IFVE-OEF—83-17) Inclusive neutral pion production in interactions of positive particles with beryllium nuclei at 10.5 GeV/c.** Akimenko, S.A.; Bannikov, A.V.; Belousov, V.I.; Blik, A.M.; Kolosov, V.N.; Krumshtejn, Eh.V.; Kuttin, V.M.; Pavlinov, A.I.; Romanovskij, V.I.; Solov'ev, A.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1983. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701809.

The experimental results concerning inclusive π^0- meson production in positive hadron (π^+, K, p)-berillium interactions at 10.5 GeV/c are presented. Dependences of invariant inclusive cross sections and their ratio on the value of the Feynman variable and transverse momentum.

31984 **(IFVE-OEF—83-81) Inclusive eta meson production by positive hadrons with the momentum of 10.5 GeV/c.** Akimenko, S.A.; Bannikov, A.V.; Belousov, V.I.; Blik, A.M.; Kolosov, V.N.; Krumshtejn, Z.V.; Kut'in, V.M.; Pavlinov, A.I.; Romanovskij, V.I.; Solov'ev, A.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1983. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701803.

The experimental results concerning inclusive eta meson production in hadron (π^+, K$^+$, p) - berillium interactions at 10.5 GeV/c are given. The comparison of the inclusive distributions of the eta-mesons producted by various beam particles is carried out. The data on invariant inclusive cross sections of eta meson production in different beams are discussed. It is shown that with the growth of Feynman variable the decrease of relative eta meson yield in Kaon and proton beams in relation to pion one is observed.

31985 **(IFVE-OEF—83-94) Study on the elastic πip p interactions at 40 GeV/c in the impact parameter representation.** Chujko, B.V.; Apokin, V.D.; Arestov, Yu.I.; Kozlovskij, E.A.; Matulenko, Yu.A.; Meshchanin, A.P.; Nurushev, S.B.; Siksin, V.V.; Solov'ev, L.F.; Solov'yanov, V.L. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1983. 17p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701804.

Results on study of elastic π^{+-}p scattering at 40 GeV/c in terms of the impact parameter are presented. It is shown that in the range of small momentum transfers the imaginary part of non-spin-flip scattering amplitude gives the main contribution into the differential cross section. Overlap functions and r. m. s. radii in transverse plane are determined. The pion and proton transparency in a head-on collision is 0.17 being four times as much as similar value in pp-scattering. Energy evolution of the transparency and eikonal is discussed.

31986 **(IFVE-OEF—83-109) Observation of a structure in PHIπ0 mass spectrum.** Bityukov, S.I.; Dorofeev, V.A.; Dzhelyadin, R.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1983. 6p. (SERP-E—142). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701802.

A structure with the mass of (1430+-20) MeV/c^2 and the width of (100+-30) MeV/c^2, C(1430), has been observed in the mass spectrum of the phiπ^0 system produced in the charge exchange reaction π^0p$\rightarrow$phiπ^0n at 32.5 GeV/c pion momentum. Its statistical significance is more than 8 standard deviations. C(1430) state has an isospin I=1, odd charge parity and spin >=1.

31987 **(INIS-mf—8708) Study of the space-time structure of the leptonic weak charged current by measurement of the muon polarization from the reaction anti νsub(μ)+Fe->X+μ^+.** Metz, E. (Hamburg Univ. (Germany, F.R.). Fachbereich Physik). 10 Sep 1982. 125p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780226.

An experiment for the measurement of the longitudinal polarization of muons was performed which were produced in the deep inelastic anti ν-nucleon scattering in an irontarget (CDHS detector). The muon decay was applied as indicator of the muon polarization. As polarimeter served a marmor-scintillator calorimeter (CHARM detector). The experiment was performed in the broad-band beam of the CERN SPS. Measured was the longitudinal polarization P = 0.82 +- 0.07 (stat.) +- 0.12 (syst.). That means that the weak charged current possesses a dominant vector and/or axial-vector structure. Regarding the measuring errors of the muon polarization an upper limit for possible S-, P-, and T- contributions to the weak charged current can be stated: sigmasub(S,P,T)/sigmasub(TOT) < 20%. A measurement of the muon polarization for large y (y > 0.5) relatively to the muon polarization for small y (y < 0.2) yields a longitudinal polarization P(y > 0.5) = 1.10 +- 0.24 (stat.). The systematic error vanishes in this relative measurement. Measured value and error lead to an upper limit for S- and/or P-contributions: sigmasub(S,P):sigmasub(TOT) < 7%. From the inelasticity distributions in the ν nucleon scattering a comparable upper limit of 6% for the contribution of S- and/or P-terms to the weak charged currents can be obtained. Summarizing it can be said that the leptonic weak charged current possesses also at large momentum transfer (Q^2 approx.= 4 (GeV/c)^2) a vector and/or axial-vector structure. (orig./HSI).

31988 (INIS-SU—196, pp 10-12) **Polarization measuring for proton of recoil in the γ+p $\rightarrow$ p+π^0 reaction at Esub(γ)=0,65-1,4 GeV for the angles THETAsub(π) < 90 deg in the center-of-mass system.** Bratashevskij, A.S.; Zybalov, A.A.; Karasev, S.P.; Konovalov, O.G.; Sorokin, P.V.; Tenishev, A.Eh. 1982. (In Russian). NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780041. (CONF-8105209—No.1(19)).

From All-union seminar electromagnetic interactions of hadrons in the resonance energy range; Khar'kov, Ukrainian SSR (26 May 1981).

Measurement results of proton polarization in the γ+p $\rightarrow$ p+π^0 reactions at the angles of Qsub(π) < 90 deg in the c. m. s. in the 0.65-1.4 GeV photon range are presented. The measurements are conducted by means of an optical spark chamber telescope and a magnetic spectrometer on a linac photon beam. The measurement results are compared with the Metkalf-Walker (MW) phenomenological analysis. The energy dependence of polarization does not agree with the MW analysis at 1.1-1.4 GeV.

31989 (INIS-SU—196, pp 3-6) **Polarization parameters Σ, T, P for the γp $\rightarrow$ pπ^0 reaction in the 280-450 MeV photon energy range.** Belyaev, A.A.; Get'man, V.A.; Gorbenko, V.G. (and others). 1982. (In Russian). NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780041. (CONF-8105209—No.1(19)).

From All-union seminar electromagnetic interactions of hadrons in the resonance energy range; Khar'kov, Ukrainian SSR (26 May 1981).

The results of experimental investigation into polarization parameters Σ (asymmetry of cross sections for linearly polarized photons), T (asymmetry of cross sections on a polarized proton target), P (polarization of recoil protons) for the reaction of neutral pion photoproduction on a proton are presented. The measurements are conducted within the frames of the double polarized experiment of polarized beam-polarized target type for 280, 300, 320, 350, 380, 400, 420 and 450 MeV photon energies and for pion exit angle within 60-135 deg range. The experimental results are compared with predictions of phenomenological multipole analyses and experimental results of other laboratories. The obtained data may be used for multipole analysis of the $\gamma p \rightarrow p\pi^0$ reaction.

31990 **(JINR—R-1-83-432) Experimental data on the inclusive cross sections of protons, deuterons and tritium cumulative production.** Baldin, A.M.; Bondarev, V.K.; Ghiordanescu, N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 24p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701697.

The invariant inclusive cross section of proton, deuteron and tritium production in pA- and dA-interactions with 8.9 GeV/c incident momentum are presented. The energy, angular (within the 90 deg - 180 deg), and A-dependences are studied. Angular dependence is carried out for 500, 700 and 900 MeV/c in pA-interactions and for 700 MeV/c in dA-interaction. Within 8-400 GeV incident energy range, the limiting fragmentation takes place. The universal character of the particle cross section dependence on the emission angle is an indication to the proportionality of the nuclear quark-parton structure function.

31991 **(LA—9933-C-Vol.1) Proceedings of the third LAMPF II workshop. Volume 1.** Allred, J.C.; Bhatia, T.S.; Ruminer, K.; Talley, B. (eds.). (Los Alamos National Lab., NM (USA)). Nov 1983. Contract W-7405-ENG-36. 548p. (CONF-830798—Vol.1). NTIS, PC A23/MF A01; 1; GPO Dep. Order Number DE84004529.

From 3. LAMPF II workshop; Los Alamos, NM, USA (18 Jul 1983).

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The aim of this workshop was twofold: (1) to continue to identify areas of fundamental physics that become accessible with a facility such as the proposed LAMPF I accelerator, and (2) to plan specific experiments that aim at such fundamental studies. This volume contains 30 invited papers. Separate abstracts were prepared for 28 of the papers; two papers were previously included in the data base. (WHK)

31992 **(LA—9933-C-Vol.2) Proceedings of the third LAMPF II workshop. Volume 2.** Allred, J.C.; Bhatia, T.S.; Ruminer, K.; Talley, B. (eds.). (Los Alamos National Lab., NM (USA)). Nov 1983. Contract W-7405-ENG-36. 534p. (CONF-830798—Vol.2). NTIS, PC A23/MF A01; GPO Dep. Order Number DE84004473.

From 3. LAMPF II workshop; Los Alamos, NM, USA (18 Jul 1983).

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The aim of this workshop was twofold: (1) to continue to identify areas of fundamental physics that become accessible with a facility such as the proposed LAMPF I accelerator, and (2) to plan specific experiments that aim at such fundamental studies. This volume contains nine invited papers, thirty-seven summaries of the working group sessions, seven summaries of facility requirements, and four conference summaries. Separate abstracts were prepared for fifty-four of the fifty-seven papers; three papers were previously included in the data base. (WHK)

31993 **(LBL—17795) Lifetime of the tau lepton.** Amidei, D.E. (Lawrence Berkeley Lab., CA (USA)). May 1984. Contract AC03-76SF00098. 117p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012307.

Portions are illegible in microfiche products; Thesis.

We have installed a high resolution vertex detector in the Mark II at PEP, and used this detector in a precision measurement of the life-time of the tau lepton. The result is tau/sub tau/ = (2.80 +- .24 +- 0.25) x 10^{-13} seconds where the first error is statistical, and the second is systematic. This result implies that the tau couples to the charged weak current with an amplitude within 7% of the universal Fermi coupling strength. 30 references.

31994 **(LUIP—8311) Search for charmed particles in neutrino induced reactions. A study of light-ion collisions at very high energy.** Claesson, G. (Lund Univ. (Sweden). Dept. of Cosmic and Subatomic Physics). 1983. 95p. (LUNFD6/NFFK—7034/1-27(1983)). NTIS (US Sales Only), PC A05/MF A01. Order Number DE84701810.

A hybrid experiment with nuclear emulsion as target and vertex detector and downstream spark-chambers, analyzing magnet and a calorimeter with flash-tube read-out was set up at Fermilab in 1978. The neutrino beam at FNAL was used. 5-10percent of the neutrino events in the emulsion were expected to produce charmed particles. The properties of these was the main aim of the experiment. The procedure to make emulsion pellicles from emulsion gel is described. A method to detect short-lived particles with life-times down to 10^{-15}s was developed and applied on neutrino events. The second part of the thesis concerns a study of light-ion collisions at the highest c.m. energies yet reached for accelerator produced collisions involving nuclei. Elastic scattering in alpha-alpha and alpha-proton collisions at SQR(S) 125 GeV and 88 GeV. resp., was studied and compared to Glauber model calculations. Fragmentation of alpha-particles was also studied. Hadron production at large p(sub)t was measured and compared to pp-collions.

31995 (LUIP—8311, pp 12) **Method for analyzing elastic scattering data sampled with the SFM-detector at the CERN ISR.** Claesson, G. 1983. B. Order Number TI84701810. (LUIP—8312; LUNFD6/NFFK—7035/1-12(1983)).

In Search for charmed particles in neutrino induced reactions. A study of light-ion collisions at very high energy.

This paper describes a method for determination of the squared 4-momentum transfer, t, in elastic collisions sampled with the Split-Field-Magnet detector (SFM) at the CERN ISR. The t-values are calculated from the measured scattering angles and initial momenta of the beam particles. The method determines t with a relative error of 2percent in Monte-Carlo generated elastic events. The method seems to be effective in rejecting inelastic events by means of a chi^2-test.

31996 **(RL—83-059) Comparison of charged current cross-sections and structure functions for neutrino and antineutrino beams on hydrogen and neon.** (Rutherford Appleton Lab., Chilton (UK)). Jul 1983. 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701805.

Using BEBC equipped with a hydrogen-filled neon-surrounded track sensitive target, the charged current cross sections and structure functions of hydrogen and neon targets traversed by the same neutrinos and antineutrinos are compared directly. The measured total cross section ratios between hydrogen and neon allow precise total cross section values for hydrogen to be inferred. Using this normalisation, the ν and ν-bar hydrogen data are combined and the quark distributions in free nucleons, parametrised as functions of xi, are extracted. This free-nucleon parametrisation is then compared directly with the neon data in order to measure nuclear effects such as those recently reported by the EMC collaboration. Only small effects are seen, in excellent agreement with recent SLAC data in a more similar A and q^2 range.

31997 **(SLAC-PUB—3312) New results on radiative J/psi decays from MARK III at SPEAR.** Wermes, N. (Stanford Linear Accelerator Center, CA (USA)). Apr 1984. Contract AC03-76SF00515. 20p. (CONF-8403121—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012222.

From New particle production at high energy meeting: The Recontre de Moriond; La Plagne, France (4 Mar 1984).

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Selected topics on radiative decays of the J/psi from MARK III at SPEAR are presented. These topics include the decay J/psi → γK anti K where the final state resonances f'(1515), θ(1700) and ξ(2200) have been analyzed. The decay J/psi → (γ vector vector) is

presented in three final states, J/psi → γ phi phi, γ rho rho and γωω, providing the first measurement of the eta/sub c/ spin-parity (in γ phi phi) and evidence for structures (in γ rho rho and γωω) near 1.7 GeV. 24 references.

31998 **(SLAC-PUB—3323) Weak decays at PEP.** Yelton, J.M. (Stanford Linear Accelerator Center, CA (USA)). Apr 1984. Contract AC03-76SF00515. 13p. (CONF-840280—5). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012512.

From Recontre de Moriond meeting on electro weal interactions and unified theories; La Plaque, France (26 Feb 1984).

Results are presented on four aspects of weak decays. The MARK II measurement of the tau lifetime, the MARK II measurement of the D^0 lifetime, the measurement from several experiments of the semi-leptonic branching fractions of hadrons constraining b and c quarks, and lastly the MAC measurement of the B lifetime. 30 references.

31999 **(SLAC-PUB—3335) New particle searches at PEP.** Band, H.R. (Northeastern Univ., Boston, MA (USA). Dept. of Physics; Stanford Linear Accelerator Center, CA (USA)). May 1984. Contract AC03-76SF00515. 11p. (CONF-840280—6). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012892.

From Recontre de Moriond meeting on electro weal interactions and unified theories; La Plaque, France (26 Feb 1984).

New particle searches by TPC, MARK II, and MAC are reviewed. No evidence of supersymmetric particle production has been seen in two possible reactions. Improved lower bounds on the e mass have been set. The TPC search for charge (4/3)e particles is reported. 14 references.

32000 **(SLAC-PUB—3336) Lifetime measurements and tau physics at PEP.** Gladney, L.D. (Stanford Linear Accelerator Center, CA (USA)). May 1984. Contract AC03-76SF00515. 8p. (CONF-8404163—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012375.

From 6. international conference on high energy physics; Nashville, TN, USA (5 Apr 1984).

Recent updates on the measurements of the tau and D^0 lifetimes by the Mark II Collaboration and on measurements of the tau and B-hadron lifetimes by the MAC Collaboration are presented. A new determination of an upper limit for the tau neutrino mass by the Mark II Collaboration and a recent measurement of Cabibbo-suppressed tau decay branching ratios from the DELCO Collaboration are also presented. 18 references.

32001 **(SLAC-PUB—3345) Ep option at the SSC.** Prescott, C.Y. (Stanford Linear Accelerator Center, CA (USA)). May 1984. Contract AC03-76SF00515. 7p. (CONF-840154—2). NTIS, PC A02; 3; GPO Dep. Order Number DE84012228.

From PSSC fixed target workshop; Woodland, TX, USA (27 Jan 1984).

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The possibilities for colliding electrons with the 20 TeV proton beams of the SSC are considered. Kinematics of ep colliding beams is reviewed. Energies that may be possible and interesting are suggested, and detector problems associated with the highly imbalanced collisions are briefly considered.

32002 **(TRI-PP—82-20) Low-energy n-p capture as a probe of two-nucleon dynamics.** Greben, J.M.; Woloshyn, R.M. (TRIUMF, Vancouver, British Columbia (Canada)). May 1982. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701811.

We examine the sensitivity of the cross section and polarization observables in radiative neutron-proton capture to the uncertainty in the two-nucleon potential at short and intermediate range. These uncertainties are modelled by unitary phase-equivalent transformations of the Hamiltonian. We find that the photon linear polarization is very sensitive to the resulting changes in the wave functions. The neutron analyzing power is rather insensitive to these changes and could play a role in identifying effects not included in a potential model description.

32003 **(TRI-PP—82-27) Decay π0→μe.** Bryman, D. (TRIUMF, Vancouver, British Columbia (Canada)). Jul 1982. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701812.

An upper limit for the branching ratio of the decay $\pi^0 \rightarrow \mu e$ is determined from existing experimental data to be lambda($\pi^0 \rightarrow \mu e$)/lambda($\mu^0 \rightarrow$ all) $< 7 \times 10^{-8}$ (90 percent C.L.). Phenomenological implications are discussed. The sensitivity of $\pi^0 \rightarrow \mu e$ decay to the presence of Higgs particles responsible for muon number violation is found to be considerably lower than for muon-electron conversion in the field of a nucleus.

32004 **(TRI-PP—82-41) Pion production from deuterium by the bombardment with polarized protons of 277 and 500 MeV.** Lolos, G.J.; Auld, E.G.; Giles, G.; Jones, G.; McParland, B.; Ottewell, D.; Walden, P.L.; Zeigler, W. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701814.

Analyzing power measurements of the (anti) pd → tπ^+ reaction are reported at incident proton energies of 277 and 500 MeV. The 277 MeV results span the angular range from 70° to 130° in the centre of mass while the two 500 MeV measurements at large angles were taken as a check of published results. With the angular distribution of the analyzing power at 277 MeV being now available, an examination of the energy dependence of the analyzing power shows that it exhibits characteristics closely resembling the shape and magnitude of the distribution observed for nuclei in the 9-12 mass range.

32005 **(TRI-PP—82-42) New Measurement of the $\pi \rightarrow e\nu$ branching ratio.** Dixit, M.S.; Robertson, B.C.; Bryman, D.A.; Dubois, R.; Numao, T.; Olaniyi, B.; Olin, A.; Berghofer, D.; Poutissou, J.-M.; Macdonald, J.A. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701815.

A new measurement of the $\pi \rightarrow e\nu$ branching ratio yields GAMMA($\pi \rightarrow e\nu$ + $\pi \rightarrow e\nu\gamma$) / GAMMA($\pi \rightarrow \mu\nu$ + $\pi \rightarrow \gamma\nu\mu$) = (1.218 +- 0.014) x 10^{-4}. The measured value is in good agreement with the standard model prediction incorporating electron-muon universality.

32006 **(TRI-PP—82-43) Search for massive neutrinos in $\pi \rightarrow e\nu$ decay.** Dixit, M.S.; Bryman, D.A.; Dubois, R.; Numao, T.; Olaniyi, B.; Olin, A.; Poutissou, J.M.; Macdonald, J.A. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 5p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701807.

The positron spectrum from $\pi^+ \rightarrow e^+ \nu_e$ decay has been examined for evidence of peaks arising from an admixture in the ν_e weak eigenstate of massive neutrinos. Limits on the intensity of such peaks, together with the measured $\pi \rightarrow e\nu$ branching ratio, have been used to derive constraints on the neutrino mixing parameters over the range 4 MeV $< m(\nu) <$ 120 MeV.

32007 **(TRI-PP—82-53) Spin-spin correlations in the reaction (anti)p(anti(p)) → pnπ+ at intermediate energies.** Shypit, R.; Waltham, C.E.; Axen, D.A. (TRIUMF, Vancouver, British Columbia (Canada)). Dec 1982. 3p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701799.

Spin-spin correlation parameters A sub(LL), A sub(SL) A sub(NN), and A sub(SS) been measured for the reaction (anti)p(anti)p → pnπ^+ with incident beam energies of 510, 465 and 420 MeV. Clean separation of free-proton events from the carbon background has been achieved.

32008 **(TRI-PP—83-6) M1 suppression in pion photoproduction on ^{13}C.** Tiator, L. (TRIUMF, Vancouver, British Columbia (Canada)). Feb 1983. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701816.

Recently measured anomalously low cross sections for $^{13}C(\gamma,\pi^-)^{13}N$ at low energy and theta sub(π)sup(lab) = 90 degrees have been analyzed in a DWIA calculation. It has been found that

the EO contribution alone is able to explain the data, so that the MI cross section is expected to vanish. Using constraints from recent magnetic electron scattering, an explanation is possible by assuming a significantly lower reduced density matrix element for spin-flip isovector transitions with angular momentum L = 2 than predicted by Cohen-Kurath.

32009 **(UNIGRAZ-UTP—07-83) Nucleon-deuteron low energy parameters.** Zankel, H.; Mathelitsch, L. (Graz Univ. (Austria)). 1983. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701758.

Momentum space Fadeev equations are solved for nucleon-deuteron scattering and effective range parameters are calculated. A reverse trend is found in the two spin states by ^{4}asub(nd) < ^{4}asub(pd) and ^{2}asub(pd) < ^{2}asub(nd) which is in agreement with a configuration space calculation, but in conflict with all existing experiments. The Coulomb contributions to the effective range are small in quartet but sizeable in doublet scattering.

32010 **Limits on muon-neutrino oscillations in the mass range $30<\Delta m^2<1000$ eV^2/c^4.** Stockdale, I.E.; Bodek, A.; Borcherding, F.; Giokaris, N.; Lang, K.; Garfinkle, D.; Merritt, F.S.; Oreglia, M.; Reutens, P.; Auchincloss, P.S. . (Department of Physics and Astronomy, University of Rochester, Rochester, New York 14627). *Physical Review Letters;* **52**: No. 16, 1384-1388(16 Apr 1984).

A search for inclusive muon-neutrino (ν/sub μ/) oscillations has been performed in the Fermilab narrow-band neutrino beam using two detectors running simultaneously at two distances from the neutrino source. The data show no evidence for a distance dependence of the neutrino flux and rule out oscillations of ν/sub μ/ into any other single type of neutrino for $30<\Delta m^2<1000$ eV^2/c^4 and $\sin^2(2\theta)>0.02$—0.20.

32011 **Azimuthal asymmetry of negatively charged hadrons in the anti $\nu N \rightarrow \mu^+ h^- X$ reaction.** Ammosov, V.V.; Asratyan, A.Eh.; Berge, D.P. *Pis'ma v Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki;* **38**: No. 4, 210-211(25 Aug 1983). (In Russian).

Short note. For English translation see the journal JETP Letters (USA).

32012 **Muon-decay neutrinos and limits on neutrino oscillations.** Nemethy, P. (Lawrence Berkeley Laboratory, Berkeley, CA 94720). pp 263-270 of Gauge theories, massive neutrinos, and proton decay. Kursunoglu, B.; Perlmutter, A. New York, NY; Plenum Publishing Corp. (1981). (CONF-810134—).

From Orbis scientiae conference; Fort Lauderdale, FL, USA (19 Jan 1981).

This chapter presents some "doubly parasitic" results on neutrino oscillations by further analysis of a low energy neutrino experiment at Los Alamos originally conducted with a different motivation. Assumes that oscillations occur between only two neutrino states. Shows the neutrino spectra obtained from 400 coulombs and 1000 coulombs of protons, respectively on D_2O and H_2O. Concludes that, within stated limits, there is no evidence for neutrino oscillations in either channel.

6452 Particle Interactions And Properties - Theoretical

REFER ALSO TO CITATION(S) 32110, 32186, 32188, 32215, 32228, 32232

32013 **(BNL—34712) Glueballs and beyond.** Lindenbaum, S.J. (Brookhaven National Lab., Upton, NY (USA); City Coll., New York (USA)). Dec 1983. Contract AC02-76CH00016;AC02-83ER40107. 49p. (CONF-831277—1). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012172.

From 1. international conference on the physics of the 21st century; Tuscon, AZ, USA (5 Dec 1983).

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One of the most exciting developments in the physics of the 20th Century is the proposal that locally gauge invariant groups describe the strong, electromagnetic and weak interactions. SU(2)/sub L/ x U(1) the electroweak group has had enormous successes including the recent discovery of the W/sup +-/ and Z^0. In the case of strong interactions, Quantum Chromodynamics is built upon the local gauge invariance of SU(3)/sub color/ which gives rise to the eight massless spin 1 gauge bosons which carry color called gluons. The colored quarks are then added to yield Quantum Chromodynamics (QCD). Although there have been many dynamical and static successes of QCD, there has been one important missing link in QCD which casts a dark shadow over it and SU(3)/sub color/. Let us assume the strong interactions are described by locally gauge invariant SU(3)/sub color/ in a pure Yang Mills theory. Then if we consider the effects of confinement one is inescapably led to the existence of glueballs (multigluon resonant states). Experimentally we found vast numbers of q anti q states and qqq states but until recently no convincing evidence for glueballs. Fortunately recent work has led to the discovery of glueballs provided one assumes the following two simple input axioms: (1) QCD is correct and (2) the OZI (or Zweig) Rule is universal for weakly coupled glue in disconnected Zweig diagrams where the disconnection is caused by creation or annihilation of new flavors of quarks. There are other glueball candidates found in the radiative J/psi decays and some relatively weaker candidates from direct pattern recognition in hadronic spectroscopy, nonet + glueball → decuplet with characteristic mixing splitting. The evidence for glueballs is discussed and speculation on what lies beyond for the physics of the 21st Century is given. 36 references.

32014 **(IFVE-OTF—82-203) Average multiplicities in deep inelastic processes and their interpretation.** Kiselev, A.V.; Petrov, V.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701784.

The asymptotic expressions for total, backward and forward multiplicities are found in frameWork of perturbative QCD. The ambiguity in the interpretation of these quantities in terms of fragmentation properties of partons is discussed. It is shown that at modern energies the et evolUtion in deep inelastic process is mainly of nonpertUrbative character. With the increase of a square of final hadron state energy W^2 the main contribution to average multiplicity comes from parton subprocess due to formation of massive quark and gluon jets and their successive fragmentation, as di quark contribution becomes less and less essential. At asymptotically high W^2 the ratio of average multiplicities of particles tends to unity.

32015 **(IFVE-OTF—83-26) Radiative detection of spin 3/2 particles in e^+e^- interactions.** Klimenko, K.G.; Tikhonin, F.F. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1983. 5p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701785.

Cross-section for the process $e^+e^- \rightarrow$ ygsub(3/2)gtidlesub(3/2) has been calculated all the spin projections being taken into account. Photon energy dependence differs greatly from that of process $e^+e^- \rightarrow \gamma\omega\omega$ tidle. In the case of eXistence of spin 3/2 neutral fermions such processes give a good possibility for their signal detection.

32016 **(INIS-mf—8354) Phenomenological Lagrangian functions and pionic decays of the heavy lepton tau.** Kluever, A. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Physik). 12 Dec 1980. 42p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780231.

After a description of the construction of nonlinear realizations of compact groups by means of the example of the three-dimensional realization of the group SU(2)xSU(2) the author constructs a Lagrangian density for the interaction of pions with the tau particle, from which the decay of the tau-particle into one, two, or three pions is calculated. Thereafter an extension of this model is presented, in which by the postulation of gauge invariance a set of vector fields is obtained which can be identified with the rho triplet and the A_1 triplet. The pionic decays of the tau are calculated once more under the assumption of the occurrence of these particles as intermediate states. The obtained results are compared with the experimental situation. (HSI).

32017 **(INIS-mf—8715) Charm and its production in neutrino reactions.** Bosetti, P.C. (Technische Hochschule Aachen (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 19 May 1982. 116p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780225.

The present thesis gives a survey about the status of the studies of charmed particles. First the quark model is explained. Then it is shown how the spectroscopy of hadrons is extended, if one goes on from the three-quark model to the four-quark model. In the third chapter it is explained how from the weak interaction on the existence of the charmed quark can be concluded. Thereafter the evidences of the existence of a fourth quark from the e^+e^- annihilation are descrbed. Here also the detection of the J/psi is discussed which could be interpreted as bound state of a new quark-antiquark system and therefore proved the existence of a new quark. In the fifth chapter the production of charmed particles in neutrino experiments is described. Lepton pair events are discussed which showed that the fourth quark is identical with the theoretically predicted charmed quark. The sixth chapter deals with the direct observation of charmed particles in neutrino reactions and finishes with a determination of the production rate of charmed particles in the framework of the quark-parton model. In the seventh chapter the production of charmed particles in electromagnetic and hadronic interactions is discussed. Thereafter follows in the eight chapter a discussion of the decays of charmed particles. (orig./HSI).

32018 (INIS-mf—8935, pp 103-112) **Confinement forces in backward proton production off nuclei.** Kopeliovich, B.Z.; Niedermayer, F. (Joint Inst. for Nuclear Research, Dubna (USSR)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The main unsolved problem of quantum chromodynamics is the problem of color confinement. A new mechanism based on ideas of color confinement is proposed for backward proton production off nuclei. (author).

32019 **(JINR—E-2-83-177) $\pi\pi$-scattering lengths.** Volkov, M.K.; Osipov, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1983. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701786.

The a_0^0, a_0^2, a_1^1, a_2^0, a_2^2, and a_3^1 $\pi\pi$ scattering lengths are calculated in the framework of the composite meson model which is based on four-quark interactions. The decay form factors of rho $\rightarrow 2\pi$ and epsilon $\rightarrow 2\pi$ are used. The q^2-terms of the quark box diagrams are taken into account. The values for a_2^0 and a_2^2 are close to each other. The a_0^0 and a_1^1 scattering lengths differ from Weinberg theoretical estimations. The a_0^2 scattering length corresponds to Weinberg data.

32020 **(JINR—R-2-83-490) πK-scattering lengths.** Volkov, M.K.; Osipov, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics; Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1983. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701787.

The msub(π)asub(0)sup(1/2)=0.1, msub(π)asub(0)sup(3/2)=-0.1, msub(π)asub(0)sup((-))=0.07, msub(π)sup(3)asub(1)sup(1/2)=0.018, msub(π)sup(3)asub(1)aup(3/2)=0.002, msub(π)sup(3)asub(1)sup((-))=0.0044, msub(π)sup(5)asub(2)sup(1/2)=2.4x10sup(-4) and msub(π)sup(5)asub(2)sup(3/2)=-1.2x10sup(-4) scattering lengths are calculated in the framework of the composite meson model which is based on four-quark interaction. The decay form factors of (rho, epsilon, S*) $\rightarrow 2\pi$, (K tilde, K*) $\rightarrow$ Kπ are used. The q^2-terms of the quark box diagrams are taken into account. It is shown that the q^2-terms of the box diagrams give the main contribution to the s-wave scattering lengths. The diagrams with the intermediate vector mesons begin to play the essential role at calculation of the p- and d-wave scattering lengths.

32021 **(LBL—17688) Electroweak interactions at the SSC: introductory remarks multi W and Z production.** Gaillard, M.K. (Lawrence Berkeley Lab., CA (USA)). Mar 1984. Contract AC03-76SF00098. 13p. (CONF-840275—7). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011581.

From Workshop on anti pp options for the SSC; Chicago, IL, USA (13 Feb 1984).

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This report is a partial summary of the work of the electroweak interaction study group at the Workshop on p anti p Options for the Super Collider, University of Chicago, February 13-17, 1984. Included are general remarks concerning the topics studied and a discussion of multi intermediate vector boson production as a probe of the gauge and scalar sectors of the electroweak theory.

32022 **(RL—83-056) Chiral Lagrangian calculation of nucleon decay modes induced by d = 5 supersymmetric operators.** Chadha, S.; Daniel, M. (Rutherford Appleton Lab., Chilton (UK)). Jun 1983. 11p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701797.

We consider the general baryon number violating operators which are produced by dressing the supersymmetric dimension five operators by gaugino exchanges. We then use chiral dynamics to calculate the widths for the decay modes p -> $K^+\nu$-barsub(d), K^0e^+sub(d), and n -> $K^0\nu$-barsub(d). The resulting branching ratios are rather sensitive to the precise admixture of the various baryon number violating operators involved. In particular the decay mode p -> $K^+\nu$-barsub(d) is generally dominant in qualitative agreement with previous quark model results.

32023 **(RL—83-061) Why do we need better measurements of $\sin^2$ theta, rho and gauge boson masses.** Olechowski, M.; Pokorski, S. (Rutherford Appleton Lab., Chilton (UK)). Jun 1983. 6p. (CONF-8305119—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701788.

From 4. Warsaw symposium of elementary particles; Kazimierz, Poland (30 May 1983).

Sensitivity of low energy weak parameters to possible new mass scales is discussed within SU(2) x SU(2) x U(1) models and SO(10) unification. Accuracy better than 0.5% is needed for meaningful tests of the standard model in region up to 1 TeV and of the SU(5) prediction for $\sin^2$ theta.

32024 **(RL—83-073) Aspects of e^+e^- physics.** Saxon, D.H. (Rutherford Appleton Lab., Chilton (UK)). Aug 1983. 43p. (CONF-8309219—1). NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701789.

From International school of elementary particle physics; Kupari, Yugoslavia (18 Sep 1983).

Electron-positron annihilation to fermion pairs is discussed, with emphasis on tests of the properties of the electro-weak current, and searches for new particles. Two photon processes are described, in particular the pointlike coupling of the photon. Results are included up to July 1983.

32025 **(TRI-PP—82-25) Calculation of the conjoined production of Higgs bosons and heavy flavours in p-antip collisions.** Ng, J.N.; Zakarauskas, P. (TRIUMF, Vancouver, British Columbia (Canada)). Jun 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701798.

We have performed a Monte-Carlo calculation of semi-inclusive Higgs boson, H^0, production in conjunction with heavy quark flavours in p-antip collisions via quark-antiquark annihilations. The cross section as functions of Higgs mass and heavy quark masses as well as transverse momentum distributions of H^0 are given.

32026 **(TRI-PP—82-30) Neutrinoless double-beta decay in left-right symmetric models.** Picciotto, C.E.; Zahir, M.S. (Victoria Univ., British Columbia (Canada). Dept. of Physics; TRIUMF, Vancouver, British Columbia (Canada)). Jun 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701790.

Neutrinoless double-beta decay is calculated via doubly charged Higgs, which occur naturally in left-right symmetric models. We find that the comparison with known half-lives yields values of phenomenological parameters which are compatible with earlier analyses of neutral current data. In particular, we obtain a right-handed gauge-boson mass lower bound of the order of 240 GeV. Using this result and expressions for neutrino masses derived in a parity non-conserving left-right symmetric model, we obtain msub(νsub(e)) < 1.5 eV, msub(νsub(μ)) < 0.05 MeV and msub(νsub(tau)) < 18 MeV.

32027 **(TRI-PP—82-34) Thermal effects on the photon mass.** Woloshyn, R.M. (TRIUMF, Vancouver, British Columbia (Canada)). Sep 1982. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701796.

It is shown that processes of O(αGsub(F)) in which the photon interacts indirectly with the thermal neutrino background dominate electric screening at low temperature. The photon electric mass still comes out to be much smaller than the present experimental limit.

32028 **(TRI-PP—82-35) (μp, e^+) conversion with Majoron emission.** Zahir, M.S.; Picciotto, C.E. (TRIUMF, Vancouver, British Columbia (Canada)). Jul 1982. 20p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701791.

We study the process of $\mu^- \rightarrow e^+$ in nuclei with the emission of a Majoron with B-L symmetry spontaneously broken by the vacuum expectation value of a Higgs triplet. We find that this mechanism may contribute to the $\mu^- \rightarrow e^+$ conversion rate at the same level as predicted by earlier models.

32029 **(TRI-PP—82-36) μp conversion via doubly charged Higgs scalar.** Picciotto, C.E.; Zahir, M.S. (TRIUMF, Vancouver, British Columbia (Canada)). Oct 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701792.

A new mechanism is used to calculate $\mu^- \rightarrow e^+$ conversion in nuclei, based on the existence of a doubly charged Higgs scalar. The scalar is part of a triplet which generates the spontaneous breakdown of B-L symmetry in an extension of the standard model, as proposed by Gelmini and Roncadelli. We find a limit for conversion rates which is comparable to those of earlier calculations.

32030 **(TRI-PP—82-48) Note on the mixings of heavy neutrinos and muon decays.** Kalyniak, P.; Ng, J.N. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 4p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701793.

The authors set limits on the mixing of heavy neutrinos into the muon family /U sub(μi)/sup(2) for neutrino masses in the range of 30 to 70 MeV/c^2. Both the Michel parameter and the e^+ spectrum are used. This complements limits from leptonic decays of pseudoscalar mesons. They also give indications of how current experiments can be used to improve these limits.

32031 **(TRI-PP—82-52) Neutrino charge in the non-linear R sub(xi) gauge.** Monyonko, N.M.; Reid, J.H. (TRIUMF, Vancouver, British Columbia (Canada)). Dec 1982. 4p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701794.

We show that the electromagnetic Ward identity for the charged W boson is satisfied in the non-linear R sub(xi) gauge. Consequently the one-loop contributions to the neutrino charge give zero, which they do not in the conventional R sub(xi) gauge.

32032 **(TRI-PP—83-1) Pion pole term in electroproduction of off-mass-shell pions.** McKellar, B.H.; Ellis, R.G. (TRIUMF, Vancouver, British Columbia (Canada)). Jan 1983. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701800.

The dependence of the invariant amplitudes for electroproduction of off-mass-shell pions on the pion Born term is investigated when current algebra Ward identities and PCAC are used to determine pion electroproduction invariant amplitudes. The authors show that an amplitude satisfying the Ward identities can be constructed starting from the usual Born terms which do not satisfy them and that this same amplitude will be obtained for a large class of input Born terms.

32033 **(TRI-PP—83-5) Glueball production in the valon-recombination model.** Zahir, M.S. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701795.

We further investigate the internal structure of a valon and determine the gluon distribution in a manner consistent with the analysis of low-p sub(T) reactions. We then proceed to calculate the possible production of glueballs in the target fragmentation of deep-inelastic νp scattering and discuss how glueball production might influence the rate of 'unfavored' particle productions in the fragmentation of hadrons.

32034 **(UNIGRAZ-UTP—09-83) Low- and medium-energetic K^-p-interaction.** Thaler, J. (Graz Univ. (Austria)). 1983. 46p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701774.

In this paper we present results from an analysis of low- and medium-energetic K^-N-scattering data with a separable energy-dependent potential model. The S-waves of the K^-N-system are treated as an inelastic single-channel problem and a form of the potential is used, which is well suited to describe resonant scattering. In this model we calculate Coulomb and mass difference corrections to scattering data and the strong interaction effect in the ground state of kaonic hydrogen. It is argued, that the discrepancy between experimental bound state data and scattering lengths cannot be solved by Coulomb corrections.

32035 **(UWThPh—80-05) Inclusive vector meson production in e^+ e^--annihilation in the weak-electromagnetic interference region.** Bartl, A.; Fraas, H.; Majerotto, W. (Vienna Univ. (Austria)). 1980. 24p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701761.

The cross section and density matrix elements for e^+ e^- -> V + x are calculated in the γ-Z^0 interference region. The Feynman-Field model for the quark fragmentation functions is extended to include the spins of the particles. Possibilities for obtaining more specific information about the spin dependence of the fragmentation mechanism and the weak coupling of quarks are discussed.

32036 **Effective weak non-leptonic Hamiltonians for flavour-conserving processes.** Miller, R.D.C.; McKellar, B.H.J. (Melbourne Univ., Australia). *Journal of Physics G: Nuclear Physics;* **10**: No. 1, 11-38(Jan 1984).

The method of decoupling discussed by previous authors is applied to the flavour-conserving non-leptonic weak interaction mediated by W and Z exchange in SU(3)xSU(2)xU(1) to derive an effective Hamiltonian in which the weak bosons and the heavy quarks are decoupled. While the theoretical methods are quite general, numerical results for the effective Hamiltonian are given for a three-quark effective theory with u, d and s quarks active, since this is of interest for weak interactions in nuclear physics. Calculations are performed in the α=O gauge and the ms-bar subtraction scheme.

32037 **Search for proton decay and other rare phenomena.** Goldhaber, M. (Brookhaven National Lab., Upton, NY). *Philosophical Transactions of the Royal Society of London, Series A: Mathematical and Physical Sciences;* **310**: No. 1512, 225-226(20 Dec 1983).

The first results have been obtained with a large water Cherenkov counter located in a salt mine in Ohio. The partial lifetime for the decay $p \rightarrow e^+ \pi^0$ is found to be longer than the value calculated from the minimal SU(5) theory, with the best presently available estimates for the parameters needed. The detector is sensitive to some other potential decay modes, as well as to some rare phenomena that have been discussed in recent years. The characteristics of the penetrating cosmic ray muons and atmospheric neutrino interactions observed are compatible with expectations.

32038 **Neutrino mixing in SO(10).** Milton, K.; Tanaka, K. (Dept. of Physics, Univ. of California, Los Angeles, CA 90024). pp 207-219 of Gauge theories, massive neutrinos, and proton decay. Kursunoglu, B.; Perlmutter, A. New York, NY; Plenum Publishing Corp. (1981). (CONF-810134—). Contract AC02-76ER01545.

From Orbis scientiae conference; Fort Lauderdale, FL, USA (19 Jan 1981).

This chapter examines the question of what kind of neutrino mixing one can expect from a framework in which mass matrix for a single generation of neutrinos is written in a GM-R-S mechanism relating the Dirac mass to the up-quark mass. The large Majorana mass is of the order of 10^{15} GeV, and the eigenvalues are A and -m^2/A. Uses a generalization of the GM-R-S mechanism for 3 neutrinos and allows various mass scales in the righthanded Majorana mass matrix. Discusses alternative mechanisms.

32039 **Flavor-color-hypercolor unification based on SO(10) /SUB V/ x SO(10) /SUB H/ .** Davidson, A.; Mannheim, P.D.; Wali, K.C. (Weizmann Inst. of Science, Rehovot). pp 221-232 of Gauge theories, massive neutrinos, and proton decay. Kursunoglu, B.; Perlmutter, A. New York, NY; Plenum Publishing Corp. (1981). (CONF-810134—). Contract AC02-76ER03533;AC02-79ER10336.

From Orbis scientiae conference; Fort Lauderdale, FL, USA (19 Jan 1981).

This chapter describes a reasonably tight scheme which unifies flavor, color, hypercolor and provides a multigenerational scheme. Discusses general features; the basic structure of the model; a few details (masses for the light or ordinary fermions; constraints from rare decays); and some results. Concludes that while the model presents an elegant solution to the generation problem by incorporating hypercolor and extended hypercolor, there is the need for more than one Higgs mechanism to accomplish the various initial symmetry breakings. Points out that the discrete symmetry which fixes the group structure, the representation of all the fermions and hence the number of generations, has to be broken spontaneously at 10^{15} GeV.

32040 **Magnetic moments of composite fermions.** Lipkin, H.J.; Perlmutter, A. (Fermi National Accelerator Laboratory, Batavia, IL 60510). pp 359-376 of Gauge theories, massive neutrinos, and proton decay. Kursunoglu, B. New York, NY; Plenum Publishing Corp. (1981). (CONF-810134—).

From Orbis scientiae conference; Fort Lauderdale, FL, USA (19 Jan 1981).

This chapter examines the magnetic moments of quarks and leptons. Explains that magnetic moments may provide the clues to choose between symmetry and composite descriptions of the structure of quarks and leptons. Discusses 2 kinds of structures with very different properties, dynamic and static. Summarizes the present status of particle magnetic moments. Points out the difficulties involved in obtaining g-2 in a composite model. A discussion of the electron spectrum requires any composite model describing the electron to be "superrelativistic" with "superconfined" constituents. Notes that such a superrelativistic superconfined system will naturally have the Dirac magnetic moment to a very good approximation.

32041 **"Expected" mixing angles or is there evidence for horizontal symmetries?.** Goldman, T. (Los Alamos National Laboratory, Los Alamos, NM). pp 111-120 of Gauge theories, massive neutrinos, and proton decay. Kursunoglu, B.; Perlmutter, A. New York, NY; Plenum Publishing Corp. (1981). (CONF-810134—).

From Orbis scientiae conference; Fort Lauderdale, FL, USA (19 Jan 1981).

This chapter considers the heresy that generation labels may not be quantum numbers. Uses statistical techniques to develop criteria for unusual generation mixings and mass ratios which would signal the existence of quantum numbers of a horizontal symmetry. Concludes that small fermion mass ratios (between generations) are consistent without the existence of horizontal symmetries; the size of the Cabibbo angle is "normal" and need not be related to horizontal symmetries; the mixing between the second and third generations may be larger than between the first and second; more direct evidence than mass ratios and mixings is necessary to determine the existence of a horizontal symmetry; and large neutrino mixing angles and almost degenerate neutrino masses are not theoretically excluded.

6453 Particle Invariance Principles And Symmetries

REFER ALSO TO CITATION(S) 32022, 32041

32042 **Mass sum rule for Higgs bosons in arbitrary models.** Langacker, P.; Weldon, H.A. (Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania 19104). *Physical Review Letters;* **52**: No. 16, 1377-1379(16 Apr 1984). Contract AC02-76ER03071.

A general quartic potential invariant under a group G and containing any number of scalar fields in arbitrary representations is shown to have a mass spectrum at the symmetry-breaking global minimum satisfying Σ/sub A/M^2/sub A/ν^2/sub A/< or =2$\lambda(\Sigma$/sub A/ν^2/sub A/)^2, where v/sub A/ is the vacuum expectation value of the Ath mass eigenfield with any singlet removed. For SU(2) x U(1) with arbitrary Higgs particles this guarantees that the lightest neutral scalar boson will satisfy M/sub min/^{2}< or =$\lambda \sqrt{2}$ / G/sub F/ = λ(350 GeV)^2 where λ is a particular quartic coupling constant.

32043 **Finiteness conditions and gauge-symmetry breakdown in N = 2 supersymmetric models.** Frere, J.; Mezincescu, L.; Yao, Y. (Stanford Linear Accelerator Center, Stanford University, Stanford, California 94305). *Physical Review* [*Section*] *D: Particles and Fields;* **29**: No. 6, 1196-1201(15 Mar 1984). Contract AC03-76SF00515;AC02-76ER01112.

In the framework of N = 2 supersymmetric models, with matter representations chosen to ensure a vanishing β function, we work out the relations between soft N = 1 supersymmetric and/or supersymmetry-breaking terms which preserve finiteness. We show explicitly in an SU(2) example that these very simple conditions are supple enough to allow for a spontaneous symmetry breaking of the gauge group, with a potential bounded from below.

6454 Field Theory

REFER ALSO TO CITATION(S) 32039, 32043

32044 **(ANL-HEP-CP—84-20) Renormalized action improvements.** Zachos, C. (Argonne National Lab., IL (USA)). 1984. Contract AC03-76SF00515. 9p. (CONF-8404119—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011810.

From Workshop on gauge theory on lattice; Argonne, IL, USA (5 Apr 1984).

Finite lattice spacing artifacts are suppressed on the renormalized actions. The renormalized action trajectories of SU(N) lattice gauge theories are considered from the standpoint of the Migdal-Kadanoff approximation. The minor renormalized trajectories which involve representations invariant under the center are discussed and quantified. 17 references.

32045 **(IFT-T—10/82) Gravitation as Gauge theory of Poincare Group.** Stedile, E. (Instituto de Fisica Teorica, Sao Paulo (Brazil)). Aug 1982. 153p. (In Portuguese). NTIS (US Sales Only), PC A08/MF A01. Order Number DE84701763.

The geometrical approach to gauge theories, based on fiber-bundles, is shown in detail. Several gauge formalisms for gravitation are examined. In particular, it is shown how to build gauge theories for non-semisimple groups. A gravitational theory for the Poincare group, with all the essential characteristics of a Yang-Mills theory is proposed. Inonu-Wigner contractions of gauge theories are introduced, which provide a Lagrangian formalism, equivalent to a Lagrangian de Sitter theory supplemented by weak constraints. Yang and Einstein theories for gravitation become particular cases of a Yang-Mills theory. The classical limit of the proposed formalism leads to the Poisson equation, for the static case.

32046 (INIS-BR—107, pp 64) **Quantization of spontaneously broken gauge theories in the unitary gauge through the Dirac bracket formalism.** Girotti, H.O. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Rothe, H.J. (Heidelberg Univ. (Germany, F.R.). Inst. fuer Theoretische Physik). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

32047 (INIS-BR—107, pp 65-66) **Some remarks on the implementation of gauge conditions.** Girotti, H.O.; Rothe, K.D. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

32048 (INIS-BR—107, pp 66) **Quantization of gauge-invariant theories through the Dirac-bracket formalism.** Costa, M.E.V.; Girotti, H.O. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

32049 (INIS-BR—107, pp 67) **Hamiltonian formulation of QED in the superaxial gauge.** Girotti, H.O. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Rothe, H.J. (Heidelberg Univ. (Germany, F.R.). Inst. fuer Theoretische Physik). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

32050 (INIS-BR—107, pp 67-68) **Quantization of non-abelian gauge theories in the Dirac-bracket formalim.** Girotti, H.O. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica); Rothe, K.D. (Sao Carlos Univ. (Brazil). Dept. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

32051 (INIS-mf—8365, pp 80) **Population explosion in the vacuum.** Hartmann, K.M. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32052 (INIS-mf—8753) **Factoriality of representations of the group of paths on SU(n).** Albeverio, S. (Bochum Univ. (Germany, F.R.). Inst. fuer Mathematik); Hoeegh-Kroh, R. (Marseille Univ., 13 (France); Centre National de la Recherche Scientifique, 13 - Marseille (France). Centre de Physique Theorique; Oslo Univ. (Norway). Matematisk Inst.); Testard, D. (Centre National de la Recherche Scientifique, 13 - Marseille (France). Centre de Physique Theorique; Centre Universitaire d'Avignon, 84 (France)). (Bielefeld Univ. (Germany, F.R.). Zentrum fuer Interdisziplinaere Forschung). 1983. 11p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701937.

We prove factoriality in the cyclic component of the vacuum for the energy representation of SU(n)-valued paths groups. The main tool is a lemma concerning generic pairs of Cartan subalgebras in the Lie algebra su(n) of SU(n) groups.

32053 (INIS-mf—8755) **Perturbative QED in terms of gauge invariant fields.** Steinmann, O. (Bielefeld Univ. (Germany, F.R.). Fakultaet fuer Physik). (Bielefeld Univ. (Germany, F.R.). Zentrum fuer Interdisziplinaere Forschung). Oct 1983. 34p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84780367.

A formulation of QED using only gauge invariant fields acting on a physical state space is discussed. The fields are the electromagnetic tensor. Fsub($\mu\nu$) and a non-local electron field PSIsub(f) depending on a quadrupole [fsup(μ)] of auxiliary functions. The f-ambiguity is physically meaningful: the fsup(μ) contain information on the asymptotic configuration of the electromagnetic field accompanying charged particles. Equations of motion are introduced and solved perturbatively, in the sense that expressions for the Wightman functions of the theory are derived. No information on the commutation relations between the basic fields is needed. (orig.).

32054 (RL—83-060) **Towards a realistic SUGRA-GUT.** Ibanez, L.E.; Ross, G.G. (Rutherford Appleton Lab., Chilton (UK)). Jun 1983. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701801.

We construct a grand unified model based on (N = 1 local supersymmetry) x SU(5) in which the only fundamental mass scale is 0(Msub(Planck)). The model predicts sin ^{2}thetasub(W) = 0.22, and has two new scales induced by gravitational effects Msub(x) approx. (Msub(Planck))/(square root (8π)), Msub(SUSY) approx. 10^{11} GeV. SU(2) x U(1) is broken by radiative corrections for a top quark mass in the range 30 < msub(t) < 130 GeV and the colour triplets of Higgs scalars are automatically superheavy.

32055 (UNIGRAZ-UTP—06-83) **More than two static Su(3) charges on the lattice.** Lang, C.B.; Wiltgen, M. (Graz Univ. (Austria)). May 1983. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701769.

We study the free energy of ensembles of two and more static charges in SU(3) lattice gauge theory. The results are obtained with Monte-Carlo integration on 6x8x8x8 lattices. Implications for systems with several quarks are discussed.

32056 **Effective-spin model for finite-temperature QCD.** Ogilvie, M. (Department of Physics, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review Letters;* **52**: No. 16, 1369-1372(16 Apr 1984). Contract AC02-76CH00016.

An effective-spin model for finite-temperature QCD is derived by use of a variant of the Migdal-Kadanoff renormalization group. Mean field theory and [for SU(3)] Monte Carlo simulation are applied to the model in order to find the deconfining phase transition. The results are in very good agreement with Monte Carlo simulations of the full theory. Mean field theory predicts that the deconfining transition in pure SU(N) lattice gauge theory is first order for all N> or =3.

32057 **New solutions of Euclidean SU(2) gauge theory.** Khan, I. (International Centre for Theoretical Physics, Trieste, Italy). *Physical Review* [*Section*] *D: Particles and Fields;* **29**: No. 6, 1168-1170(15 Mar 1984). Contract AC02-76CH00016.

New solutions of the Euclidean SU(2) gauge theory having finite field strength everywhere are presented. The solutions are self-dual or antidual and constitute a two-parameter family which includes the instantons.

32058 **Lattice action forms stable under renormalization.** Horn, D.; Zachos, C.K. (Stanford Linear Accelerator Center, Stanford University, Stanford, California 94305). *Physical Review* [*Section*] *D: Particles and Fields;* **29**: No. 6, 1202-1206(15 Mar 1984). Contract W-31-109-ENG-38;AC03-76SF00515.

We review the role of the generalized Gaussian solution to the Migdal-Kadanoff renormalization group for SU(N) lattice gauge theories, and point out that it can be continued down to very low values of the inverse coupling β. We thus explain the long-distance stable line of actions observed in numerical investigations of SU(2), and propose a simple SU(3) mixed action which should exhibit improved scaling behavior.

6455 Scattering Theory

32059 **(UNIGRAZ-UTP—11-79) High-energy behaviour of scattering phase shifts for Coulomb-like potentials.** Geszetesy, F.; Plessas, W.; Thaller, B. (Graz Univ. (Austria)). Sep 1979. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701760.

We discuss the high-energy behaviour of scattering phase shifts for a large class of spherically symmetric Coulomb-like potentials. Some results which have been known only for short-range potentials are extended to this larger class. In particular, by iterating appropriate Volterra integral equations we derive an asymptotic expansion of the phase shifts, which is valid whenever the short-range part of the potential is integrable. When applying our results to the problem of the interference between Coulomb and short-range interactions we obtain an estimate for the high-energy behaviour of the Coulomb-interference effect in the phase shifts.

65 PHYSICS. II.

32060 **(INIS-SU—212) General and nuclear physics.** (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1982. 102p. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780224.

Abstracts of individual items from the report were prepared separately for the data base.

6510 Nuclear Physics

REFER ALSO TO CITATION(S) 31007, 31991, 31992

32061 **(DOE/CH/00016—T3) Fermilab research program workbook.** Rubinstein, R. (Fermi National Accelerator Lab., Batavia, IL (USA)). May 1983. Contract AC02-76CH00016. 126p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012568.

Portions are illegible in microfiche products.

The Fermilab Research Program Workbook has been produced annually for the past several years, with the original motivation of assisting the Physics Advisory Committee in its yearly program review conducted during its summer meeting. While this is still the primary goal, the Workbook is increasingly used by others needing information on the current status of Fermilab experiments, properties of beams, and short summaries of approved experiments. At the present time, considerable changes are taking place in the facilities at Fermilab. We have come to the end of the physics program using the 400 GeV Main Ring, which is now relegated to be just an injector for the soon-to-be commissioned Tevatron. In addition, the experimental areas are in the midst of a several-year program of upgrading to 1000 GeV capability. Several new beam lines will be built in the next few years; some indications can be given of their properties, although with the caveat that designs for some are by no means final. Already there is considerable activity leading to experiments studying anti p p collisions at $\sqrt{s} = 2000$ GeV.

32062 **(DOE/NBM—4012509) Argonne National Laboratory 1983-1984.** (Argonne National Lab., IL (USA)). 1984. Contract W-31-109-ENG-38. 35p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012509.

This publication presents significant developments at Argonne National Laboratory during 1983-84. Argonne is a multidisciplinary research center with primary focus on nuclear energy, basic research, biomedical-environmental studies and alternate energy research. The laboratory is operated by the University of Chicago for the Department of Energy.

32063 **(INIS-mf—8365) Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.** (Beschleunigerlaboratorium der Univ. und Technischen Univ. Muenchen, Garching (Germany, F.R.)). 1982. 183p. NTIS (US Sales Only), PC A09/MF A01. Order Number DE84780230.

Abstracts of individual items from the report were prepared separately for the data base. (GHT)

32064 (INIS-mf—8935, pp 223-268) **Experiments in the field of relativistic nuclear physics at the Dubna synchrophasotron.** Kuznetsov, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

A brief outline of the current state of experimental research at the Dubna synchrophasotron in the field of relativistic nuclear physics is presented. Much attention is given to the available possibilities of the synchrophasotron which make research possible in the field of relativistic nuclear physics and enable the researchers to discuss the most significant physical results that have been obtained by different groups of physicists from JINR member-countries in the last few years. (author).

32065 **(JINR-D—2-82-568) Investigations in the field of relativistic nuclear physics. Proceedings.** (Joint Inst. for Nuclear Research, Dubna (USSR)). 1982. 190p. (In Russian). (CONF-8205252—). NTIS (US Sales Only), PC A09/MF A01. Order Number DE84780158.

From Meeting on investigations in the field of relativistic nuclear physics; Dubna, USSR (25 May 1982).

Papers presented were entered into the data base separately. (WHK)

32066 **1983 recent references (Cumulation).** Ramavataram, S. (Brookhaven National Laboratory, Upton, New York 11973, USA). *Nuclear Data Sheets;* **39**: No. 2, 187-188(Jun 1983). Contract AC02-76CH00016.

Keywords, reactions, and references are indexed for all literature received by the National Nuclear Data Center during 1983.

6511 Experimental Techniques

32067 **(INFN/BE—80/4) MARY: a computer code for the analysis of γ-rays following compound inelastic scattering of neutrons in experiments using close neutron source-to-scatterer geometry.** Nardelli, G.; Abbondanno, U.; Demanins, F.; Tuniz, C. (Padua Univ. (Italy); Trieste Univ. (Italy)). 20 May 1980. 44p. NTIS (US Sales Only), MF A01. Order Number DE84901165.

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The study of γ-rays following neutron inelastic scattering reactions can provide useful information relating to the properties of the residual nucleus. However, the number of nuclei which can be studied is normally limited by the necessity of having high-flux neutron beams and of using samples containing large quantities of scattering material. In the case of enriched isotopes it is often either prohibitively expensive or physically impossible to obtain such large quantities. In order to overcome such difficulties and to carry out experiments with only a few grams of scattering material one may use the small sample method suggested by S.A. Elbakr et al. for the study of the (n,n'γ) reaction and then follow the approach proposed by J.M. Davidson to correct the theoretical γ-ray angular distributions for the effects of the sample-size and of the spread of neutron flux intensities and energies over the angular range subtended by the sample at the neutron source. The computer code (MARY) designed to perform all such corrections for a cylindrical sample positioned so that its symmetry axis and the beam axis are colinear is described. The γ-producing reaction is treated in a statistical compound-nucleus (CN) formalism involving up to as many as 53 extra exit channels. Provision is made, in the program, for mixed gamma multipolarity and for choice among several neutron sources.

32068 (INIS-BR—107, pp 44-45) **Investigation of nuclear structure by quasi-free scattering with polarized protons.** Maris, T.A.J.; Schneider, C.; Vasconcellos, C.A.Z. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

6512 Nuclear Properties And Reactions, A=1-5

REFER ALSO TO CITATION(S) 32073, 32101, 32231

32069 (INIS-mf—8935, pp 187-192) **Effects of quark degrees of freedom in πd and pd scattering at large angles.** Kondratyuk, L.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki); Shevchenko, L.V. (Moskovskij Gosudarstvennyj Univ. (USSR). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The backward elastic PId- and pd-scattering at energies of 0.3-1.5 GeV is discussed. The existing data can not be described in the framework of the multiple scattering theory (MST) even if the relativity of nucleons in a deuteron is taken into account. The discrepancy between the predictions of MST and the data are interpreted as effects of many-quark resonances. (author).

32070 (INIS-mf—8935, pp 141-146) **Pion production on light nuclei by medium energy neutrons.** Roessle, E. (Freiburg Univ. (Germany, F.R.). Fakultaet fuer Physik). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The unpolarized neutron beam at SIN has been used for the investigation of pion production processes, including $np \rightarrow d\pi^0$; $nd \rightarrow t\pi^0$ and $nd \rightarrow {}^3He\pi^-$; $n + {}^{12}C \rightarrow \pi + X$. (author).

32071 (INIS-mf—8935, pp 147-151) **Study of the differential cross section of the PI+d→pp reaction at pion energies 280, 300, 330, 357, 390, 420 and 450 MeV.** Borkovskij, M.Ya.; Gaditskij, V.G.; Gavrilov, G.E. (AN SSSR, Leningrad. Inst. Yadernoj Fiziki) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Differential cross sections of the $\pi^+ d \rightarrow pp$ process at seven energies of incident pions in the region $\sqrt{s} = 2.26\text{-}2.40$ GeV have been measured at the LNPI synchrocyclotron. (author).

32072 (INIS-mf—8935, pp 153-157) **Energy dependent partial wave analysis of the PI+d→pp reaction in the region $\sqrt{s}$=2.09-2.42 GeV.** Kravtsov, A.V.; Ryskin, M.G.; Strakovskij, I.I. (AN SSSR, Leningrad. Inst. Yadernoj Fiziki). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

A satisfactory description of available experimental data (1000 points) was obtained using a model including $^3P_1$, $^1D_2$ and $^3F_3$ diproton resonances in the I=1 channel. (author).

32073 (INIS-mf—8935, pp 179-185) **Main features of the four nucleon interactions at medium energies and Glauber sum rules.** Blinov, A.V.; Chuvilo, I.V.; Drobot, V.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Systematic investigations of the nuclear reactions in many-nucleon systems at medium energies can be used for testing different theories and to study the quark and relativistic effects in nuclear physics. The interactions of four nucleons are investigated by measuring the elastic and quasi-elastic scattering cross sections of tritium and helium-3 projectiles in hydrogen-filled bubble chamber. The experimental data are compared with the predictions of the eikonal multiple scattering theory. The Glauber sum rules are analyzed. The admixture of six-quark bags in three-nucleon systems are estimated and the derived upper limit was found to be 5%.

32074 (INIS-mf—8935, pp 197-207) **Particle production in α-α and α-p collisions at the CERN ISR.** Szwed, R. (Warsaw Univ. (Poland). Inst. Fizyki Doswiadczalnej). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Particle production in the α-α and α-p collisions measured by the Split-Field-Magnet detector at the CERN ISR is studied. The inclusive multiplicity and rapidity distributions are presented and compared with p-p data and predictions of various theoretical models. The information on 'temperature' and the cluster size in α-α and α-p collisions is extracted from the data and discussed. (author).

32075 (INIS-mf—8935, pp 565-577) **Hard αp and αα interactions.** Faessler, M.A. (European Organization for Nuclear Research, Geneva (Switzerland)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Two special runs with α particles in the CERN ISR allowed to study αp and αα collisions at the highest accelerator cm energies. The inclusive cross section for hadron production in the central rapidity region was measured by four experiments simultaneously, up to transverse momenta of 8 GeV/c. Distributions and correlations of secondaries produced together with the high-psub(T) trigger particle were investigated and compared with corresponding distributions in pp collisions in order to find the mechanism responsible for the 'anomalous nuclear enhancement' of the high-psub(T) hadron yield off nuclei, which was first observed at FNAL some years ago. (author).

32076 **(TRI-PP—82-39) Elastic scattering of polarized protons from ^{3}He at intermediate energies.** Hasell, D.K.; Bracco, A.; Gubler, H.P. (TRIUMF, Vancouver, British Columbia (Canada)). Sep 1982. 4p. (CONF-820828—12). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701825.

From 9. EPS Nuclear Physics Divisional conference on nuclear structure; Amsterdam, Netherlands (29 Aug 1982).

Using the polarized proton beam facility of the TRIUMF cyclotron, differential cross sections and analyzing powers have been measured in the angular range 20° - 150° c.m. for proton elastic scattering from ^{3}He at incident proton energies of 200, 300, 415 and 515 MeV. The differential cross sections exhibit a minimum at $t = -0.33$ (GeV/c)^2 which becomes more pronounced with increasing energy. There is evidence for the onset of a second minimum corresponding to the interference between double and triple scattering amplitudes. Large analyzing powers are observed at the lower energies. The data from the present analysis, together with data obtained from the literature in the energy range 100-1000 MeV, have been analyzed within the framework of the Glauber multiple scattering formalism. Nucleon-nucleon scattering parameters were taken from a global phase shift analysis of nucleon-nucleon elastic scattering data. Reasonable agreement with the data is obtained.

32077 **(TRI-PP—82-47) Study of two-nucleon wave functions in ^{3}He.** Bracco, A.; Gubler, H.P.; Hasell, D.K. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701827.

The ^{3}He(p,2p)pn reaction has been studied in a quasi-free scattering arrangement characterized by (anti) p(recoil) = 0 and various excitation or total energies E(recoil) of the unobserved p-n pair. Data were obtained at 250 and 400 MeV at symmetric and asymmetric pairs of angles. The ^{3}He spectral function deduced in the framework of the plane wave impulse approximation is compared to the predictions of Faddeev and variational calculations. Comparisons are also made with p-n relative motion momentum distributions as the overlap between plane waves for the p-n pair and Irving, Irving-Gunn and Khanna wave functions for ^{3}He.

6513 Nuclear Properties And Reactions, A=6-19

32078 (INIS-mf—8365, pp 78-79) **Inclusive production of K^+-mesons in collisions between cold and hot nucleons.** Martschew, E.; Schuermann, B.; Zwermann, W.; Mankoc-Borstnik, N. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32079 (INIS-mf—8935, pp 475-480) **Deuteron inclusive spectra from collisions of ^{12}C with different targets at 3.6 GeV/nucl.** Adyasevich, B.P.; Antonenko, V.G.; Grigoryan, Yu.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

In high energy nuclear collisions a number of composite particles like deuterons, tritons, alphas are produced. Different models describing the production of these composites, assuming pre-existing clusters in the nucleus, are surveyed. Experimental data are reported on deuteron spectra of the reactions induced by C-12 nuclei of 3.6 MeV/nucleon on C, Cu, Sn and Pb targets. The size of the emitting source is derived. (D.Gy.).

32080 (INIS-mf—8935, pp 317-321) **Interaction of 2.1 GeV/c/n alpha particles with light and heavy nuclei.** El-Sharkawy, S.; Hegab, M.K.; Sherif, M.M. (Cairo Univ. (Egypt). Dept. of Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The multiplicity of secondary particles produced in the interactions of alpha particles with light (CNO) and heavy (AgBr) emulsion nuclei has been studied. The distributions were further analyzed into three groups according to the spallation of the projectile. An independent nucleon-nucleon multiple scattering model (INNM) is presented to account for the experimental distributions. (author).

32081 (INIS-mf—8935, pp 217-221) **Correlations of identical particles in inelastic and central carbon-carbon collisions at P=4.2 GeV/c per nucleon.** Akhababian, N.; Grishin, V.G.; Kowalski, M. (Joint Inst. for Nuclear Research, Dubna (USSR)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Two-particle correlations between negative pions and between protons in inelastic and central carbon-carbon collisions at P=4.2 GeV/c per nucleon have been studied. Mean square radii of the emission region of negative pions and protons have been estimated. A comparison of the PI^-PI^- and pp correlation function has been made for each category of events. (author).

32082 (INIS-SU—198, pp 211) **Photodisintegration of the ^{11}B nucleus.** Gol'tsov, A.N.; Goncharova, N.G.; Matveev, B.B. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32083 (INIS-SU—198, pp 158) **Origin of some monopole resonances of the p-shell nuclei.** Filippov, G.F.; Vasilevskij, V.S.; Nesterov, A.V. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

NONE

32084 (INIS-SU—198, pp 456) **Calculation of nuclear verter constant of ^7Be-$^3He^4He$.** Safronov, A.N. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32085 (INIS-SU—198, pp 266) **Space parity nonconservation in excitation of nuclei in a process of electron bremsstrahlung.** Kerimov, B.K.; Ganiev, A.G.; Ehl'gavkhari, A.I.; Safin, M.Ya. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32086 (INIS-SU—198, pp 318) **Study of vector analyzing power of the $^9Be(d,p_0)^{10}Be$ and $^9Be(d,p_1)^{10}Be$ * (3.37 MeV) reactions at E/subα)/=2.0-2.8 MeV.** Dejneko, A.S.; Zalyubovskij, I.I.; Sarana, V.D.; Tutubalip, A.I.; Shlyakhov, N.A. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32087 (JINR—E-1-83-487) **Determination of parameters of deuteron six-quark component.** Ableev, V.G.; Dimitrov, Kh.; Filipkowski, A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 2p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701826.

Experimental results for the nucleon momentum distributions in deuteron extracted from data for the momentum spectra of protons emitted at zero angles in the relativistic (8.9 GeV/c) deuteron fragmentation on C and CH_2 targets are given. The momentum distributions obtained are well described in the framework of a hybrid model of the deuteron which includes the collective six-quark-state. The parameters are estimated from the fit to experimental data. The analysis of the experimental data on deep inelastic electron (SLAC) and muon (NA4) scattering supports the results.

32088 (JINR—R-1-83-327) **Properties of pC and pTa interactions at Psub(p)=10 GeV/c accompanied by the emission of cumulative protons and π mesons.** Armutli ski, D.; Akhababyan, N.; Baldin, A.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701695.

In order to study correlative phenomena in the processes of cumulative type general characteristics for pC and pTa interactions are considered at Psub(p)=10 GeV/c accompanied by cumulative proton and π meson emission within the theta > or approximately 135 deg angle range. The comparison with relevant results for all pC and pTa interactions is made. The investigation was performed on the basis of photographs from the two-meter propane chamber. The data on cross sections of the interactions considered, on the dependence of their properties upon the value of cumulative number of the hadron emitted at theta > or approximately 135 deg angle are obtained, the dependences of invariant inclusive production cross sections of these hadrons on their cumulative number are analysed. Within the limits of the statistical accuracy no dependence of the considered characteristics on the value of cumulative number both of protons and mesons has been discovered. Interactions with the cumulative proton are accompanied with the increased proton multiplicity, and those with cumulative π-mesons - with increased multiplicity of π-mesons.

32089 **(JINR—R-1-83-431) Cumulative production of tritium, ^{3}He, ^{4}He nuclei.** Baldin, A.M.; Bondarev, V.K.; Ghiordanescu, N.; Litvinenko, A.G.; Moroz, N.S.; Panebrattsev, Yu.A.; Pentia, M.; Rikhvitskij, S.V.; StaVinskij, V.S.; Khrenov, A.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 20p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701696.

Experimental data on the energy dependence of the tritium ^{3}He and ^{4}He production cross sections at 168 deg and 90 deg emission angle, in proton (8.9 GeV/c) nucleus (Pb, Cu, Al) interactions are obtained. The X-B analysis indicates a scale invariance dependence of the nuclear fragment cross section, where B is a fragment baryon charge and X is a scaling value. The slope parameter has the value <X>=0 0.14-0.15, which is in good agreement with pion and kaon data.

32090 **(TRI-PP—83-3) Further evidence for the EELL effect.** Jennings, B.K.; de Takacsy, N. (TRIUMF, Vancouver, British Columbia (Canada)). Feb 1983. 4p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701828.

By looking at the inelastic scattering to the first excited 0^+ state in ^{12}C, it is shown that multiple scattering in the pion-nucleus system is strongly suppressed.

32091 **(TRI-PP—83-7) Energy dependence of the ^{6}Li(π^+,^{3}He)^{3}He reaction at 60, 75 and 90 MeV.** Lolos, G.J.; Johnson, R.R.; Couvert, P.; Mckenna, J.; Myers, R.; Lorraine, P.; Spadinger, I. (TRIUMF, Vancouver, British Columbia (Canada)). Feb 1983. 5p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701817.

Differential cross sections for the pionic fission reaction ^{6}Li(π^+,^{3}He)^{3}He at T sub(π) = 60, 75 and 90 MeV have been measured for theta sub(c.m.) = 41 degrees. The energy dependence of the differential cross section is found to follow an exponential decrease with increasing incident pion energy and is compared with existing theoretical predictions.

32092 **Polarized neutron capture into ^{13}C: Evidence for a secondary doorway state effect.** Woodworth, J.G.; August, R.A.; Roberson, N.R.; Tilley, D.R.; Weller, H.R.; Jury, J.W. (University of California, Lawrence Livermore National Laboratory, Livermore, California 94550). *Physical Review* [*Section*] *C: Nuclear Physics;* **29**: No. 4, 1186-1193(Apr 1984).

Angular distributions for the ^{12}C(n,γ_0)^{13}C reaction have been measured with neutrons corresponding to excitation energies of 16.0, 19.2, 20.1, 20.8, and 21.8 MeV. Legendre polynomial coefficients have been determined to second order (a_3 is small). Polarized neutron measurements were obtained at excitation energies of 16.0, 18.6, 19.2, 20.1, 21.0, 21.8, and 22.3 MeV. A structure seen in the coefficient of the Legendre polynomial P_2 for the ^{12}C(p, γ_0)^{13}N reaction is also seen in the present data. A secondary doorway state at 20.5 MeV with an apparent width of 0.5 MeV is suggested by previously measured ^{11}B(d,γ_0)^{13}C data. The presence of this state provides an explanation for the energy dependence of the cross section, the a_2 coefficient, and the analyzing power coefficient b_2 in the ^{12}C(n,γ_0)^{13}C data. The same model is also able to describe the energy dependence of the cross section and the a_2 coefficient observed in the ^{12}C(p,γ_0)^{13}N reaction in the region of 16 to 22 MeV.

32093 **Resonant alpha capture by ^{7}Be and ^{7}Li.** Hardie, G.; Filippone, B.W.; Elwyn, A.J.; Wiescher, M.; Segel, R.E. (Physics Department, Western Michigan University, Kalamazoo, Michigan 49008). *Physical Review* [*Section*] *C: Nuclear Physics;* **29**: No. 4, 1199-1206(Apr 1984). Contract W-31-109-ENG-38.

Resonances at E/sub α/ = 401, 814, and 953 keV were observed in the ^{7}Li(α,γ) reaction. From the thick target yields the corresponding states in ^{11}B at 8920, 9185, and 9274 keV were found to have center-of-mass resonance strengths of 0.0088 +- 0.0014, 0.317 +- 0.047, and 1.72 +- 0.17 eV, respectively. The radiative widths deduced for the latter two states are 0.17/sub -0.03// sup +0.06/ and 1.15 +- 0.16 eV, respectively. Using a 40 mCi ^{7}Be target, α-capture resonances were observed at E/sub α/ = 884 (^{11}C(= 8105 keV) and 1376 (^{11}C(= 8421 keV) keV with center-of-mass resonance strengths of 0.331 +- 0.041 and 3.80 +- 0.57 eV, respectively. The radiative widths deduced for these states are 0.350 +- 0.056 and 3.1 +- 1.3 eV, respectively. The observed decay rates are compared with theoretical calculations.

32094 **A0 production from low energy antiproton annihilations in complex nuclei.** Condo, G.T.; Handler, T.; Cohn, H.O. (Department of Physics, University of Tennessee, Knoxville, Tennessee 37996). *Physical Review* [*Section*] *C: Nuclear Physics;* **29**: No. 4, 1531-1533(Apr 1984).

Low energy antiproton absorptions in complex nuclei were found to produce Λ^0 hyperons with a frequency of 1.9 +- 0.4%.

32095 **Large Pauli-blocking and virtual channel effects in proton radiative capture.** Ludeking, L.D.; Cotanch, S.R. (Department of Physics, North Carolina State University, Raleigh, North Carolina 27650). *Physical Review* [*Section*] *C: Nuclear Physics;* **29**: No. 4, 1546-1548(Apr 1984).

The photonuclear reaction ^{11}B(p,γ_0) ^{12}C is analyzed within a coupled-channels framework based on a continuum shell model formulation. The microscopic description includes realistic shell model density amplitudes, Pauli-blocking effects, and a large number of nucleon + target open and closed (virtual) channels. Both Pauli corrections and virtual channel contributions are found to be sizable for energies spanning the giant dipole resonance and improved, but not detailed, agreement is obtained with experiment. The sensitivity of the theoretical E1 cross section to model interactions is documented and discussed.

32096 **Time-dependent Hartree-Fock picture of nuclear molecular resonances.** Strayer, M.R.; Cusson, R.Y.; Umar, A.S.; Reinhard, P.G.; Bromley, D.A.; Greiner, W. (Yale Univ., New Haven, CT). *Physics Letters,* [*Section*] *B;* **135**: No. 4, 261-265(9 Feb 1984).

The time-dependent Hartree-Fock method is used to calculate isovector dipole and isoscalar quadrupole and octupole molecular resonances for ^{16}O.

6514 Nuclear Properties And Reactions, A=20-38

32097 **(INIS-mf—8349) Examination of the resonance structure of ^{33}S + N by measurement of the total cross section and the elastic neutron scattering.** Jungmann, C.R. (Technische Hochschule Darmstadt (Germany, F.R.). Fachbereich Physik). 8 Jan 1982. 145p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number TI84701917.

In order to determine the resonance structure and to identify isospin-forbidden (T=3/2)-analog resonances in ^{33}S the neutron transmission of ^{32}S was measured. For spin and pority assignment of the resonances also elastic neutron scattering was examined. The neutron energy range lay between 180 keV and 19.4 MeV.

32098 **(INIS-SU—198, pp 284) Experimental study on the threshold anomaly in proton elastic scattering on nuclei with A approximately 30.** Chenzha, M.; Duma, M.; Khatsegan, K.; Tehnase, M.; Dejneko, A.S.; Malakhiv, I.Ya.; Storizhko, V.V.; Shlyakhov, N.A. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32099 **(LBL—17720) Study of beta-delayed two-proton emission in ^{22}Al and ^{26}P and search for new emitters.** Cable, M.D.; Honkanen, J.; Schloemer, E.C.; Ahmed, M.; Reiff, J.E.; Zhou, Z.Y.; Cerny, J. (Lawrence Berkeley Lab., CA (USA)). Apr 1984. Contract AC03-76SF00098. 20p. (CONF-8403127—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012255.

From 5. Nordic meeting on nuclear physics; Jyvaskyla, Finland (12 Mar 1984).

Portions are illegible in microfiche products.

As predicted by Gol'danskii, nuclei far from stability may decay via the unusual manner of ^{2}He (or 'diproton') emission. The diproton corresponds to a coupling of two protons in a virtual $^{1}S_{0}$ state which subsequently decays to two unbound protons. This ^{2}He nucleus has been calculated to have an increased probability of barrier penetration relative to the independent emission of two protons. When the energetics permit ^{2}He emission, two competing modes of two-proton emission are also frequently allowed. These are a sequential proton decay through an intermediate state and the simultaneous emission of two uncoupled protons. Recent studies on ^{22}Al and ^{26}P are described and proposed partial decay schemes are given. (WHK)

6515 Nuclear Properties And Reactions, A=39-58

32100 (INIS-mf—8935, pp 389-407) **Flow analysis of nuclear collisions - probing the properties of dense nuclear matter.** Buchwald, G.; Graebner, G.; Theis, J.; Maruhn, J.; Greiner, W. (Frankfurt Univ. (Germany, F.R.). Inst. fuer Theoretische Physik); Stoecker, H. (Michigan State Univ., East Lansing (USA). Dept. of Physics and Astronomy). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Intranuclear cascade calculations and fluid dynamics predictions of the kinetic energy flow are compared for collisions of ^{40}Ca+^{40}Ca and ^{238}U+^{238}U. The aspect ratio, R_{13} obtained from the global analysis has been found to be independent of the bombarding energy for the intranuclear cascade model. Fluid dynamics, on the other hand, predicts a dramatic increase of R_{13} at medium energies of Esub(LAB) approximately 200 MeV/n. The increase depends directly on the pressure, i.e. the nuclear matter equation of state, at high densities. A few nucleon scattering distortions of the flow tensor are analysed. Possible procedures to remove this background from experimental data are discussed. (author).

32101 (INIS-mf—8935, pp 293-298) **Participant-spectator identification in Plastic Ball events using a cluster algorithm.** Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

A cluster analysis algorithm has been applied to charged particle exclusive events of the Plastic Ball from Ca+Ca collisions at E/A=400 MeV in order to separate target and projectile spectator fragments from the midrapidity participant region. The efficiency of this analysis has been tested by its application to the results of Cascade model calculations. The accuracy of identifying fragments evaporated from the projectile remnant is 75%. (author).

32102 (INIS-SU—198, pp 56) **Study on the high-energy states of ^{50}Cr by means of the Fe(n, γ) reaction.** Begzhanov, R.B.; Akhrarov, S.M.; Kobilov, O.Sh.; Kulabdullaev, G.A. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32103 (INIS-SU—198, pp 271) **Alpha decay of a giant E2 resonance in ^{40}Ca.** Kadmenskij, S.G.; Markushev, V.P.; Sliv, L.A. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32104 **Coupled-channels fusion calculations for ^{58}Ni+^{58}Ni.** Landowne, S.; Pieper, S.C. (Physik-Department, Technische Universitat Muenchen, D-8046 Garching, Federal Republic of Germany). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1352-1357(Apr 1984). Contract W-31-109-ENG-38.

Fusion calculations are carried out for ^{58}Ni+ ^{58}Ni using the coupled-channels scattering formalism with an ingoing-wave boundary condition. The enhancement of the sub-barrier cross section due to couplings to inelastic excitation channels is studied and compared to simple, analytical estimates. At energies above the barrier the combined Coulomb-nuclear interaction significantly alters the distribution of angular momentum absorbed by the compound nucleus.

6516 Nuclear Properties And Reactions, A=59-89

32105 (INIS-SU—198, pp 70) **Lifetimes of ^{78}Se nucleus excited states measured by a plunger method.** Zobov, A.E.; Kudoyarov, M.F.; Lemberg, I.Kh.; Mishin, A.S.; Pasternak, A.A.; Rassadin, L.A.; Chugunov, I.N. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32106 (UCRL—90749) **Shell model study of $^{90\ 88}$Zr.** Becker, J.A.; Bloom, S.D.; Warburton, E.K. (Lawrence Livermore National Lab., CA (USA); Brookhaven National Lab., Upton, NY (USA)). May 1984. Contract W-7405-ENG-48. 13p. (CONF-840530—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012643.

From International symposium on in-beam nuclear spectroscopy; Debrecen, Hungary (14 May 1984).

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Conventional spherical shell model calculations have been undertaken to describe ^{90}Zr and ^{88}Zr. Valence orbitals included the 1f/sub 5/2/, 2p/sub 3/2/, 2p/sub 1/2/, and lg/sub 9/2/ for protons, and lg/sub 9/2/ and 2d/sub 5/2/ for neutrons. For ^{90}Zr, the number of lg/sub 9/2/ protons was $\leqq$ 2. For the high spin even parity states of ^{90}Zr, two calculations were performed, one with $\leqq$ 4 (0) g/sub /9/2/ protons (neutron holes) and one with $\leqq$ 2 (2) g/sub 9/2/ protons (neutron holes). For ^{88}Zr, the number of particles in the g/sub 9/2/ shell was restricted to $\leqq$ 10. For the high spin negative parity states, a calculation was done with up to 11 particles in the g/sub 9/2/ shell. A realistic two-body interaction was employed in this calculation. Predicted excitation energies are compared with experimental results, and for the lower lying positive parity states a comparison of electromagnetic transition rates is also made.

6517 Nuclear Properties And Reactions, A=90-149

REFER ALSO TO CITATION(S) 32106, 32167

32107 (CONF-840530—1) **Dynamic moments of inertia in Xe, Cs and Ba nuclei.** El-Samman, H.; Barci, V.; Gizon, A.; Gizon, J.; Hildingsson, L.; Jerrestam, D.; Klamra, W.; Kossakowski, R.; Lindblad, T.; Gono, Y.; Bengtsson, T.; Leander, G.A. (UNISOR, Oak Ridge, TN (USA); Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires; Institute of Physical and Chemical Research, Wako, Saitama (Japan); Lund Inst. of Tech. (Sweden). Dept. of Mathematical Physics). 1984. Contract AC05-76OR00033. 11p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012327.

From International symposium on in-beam nuclear spectroscopy; Debrecen, Hungary (14 May 1984).

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The γ-rays following the reactions induced by ^{12}C ions on ^{115}In, ^{112,117,122}Sn and ^{123}Sb targets have been investigated using six NaI(Tl) detectors in a two-dimensional arrangement. The collective moment of inertia I(^{2}) /sub band/ of ^{118,122}Xe, ^{123}Cs and ^{128,130}Ba have been extracted from the energy-correlation spectra. The behaviour of these nuclei and the observed differences are interpreted in terms of high-spin collective properties. Data are also presented on the effective moment of inertia I(^{2})/sub eff/ of ^{118}Xe and ^{130}Ba measured by sum-spectrometer techniques. 13 references.

32108 (CONF-8404157—1) **Octupole shaps in nuclei, and some rotational consequences thereof.** Nazarewicz, W.; Olanders, P.; Ragnarsson, I.; Dudek, J.; Leander, G.A. (UNISOR, Oak Ridge, TN (USA); Lund Inst. of Tech. (Sweden). Dept. of Mathematical Physics; Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). 1984. Contract AC05-84OR21400. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011671.

From 19. winter school on physics; Zakopane, Poland (3 Apr 1984).

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During the last years a large number of experimental papers presenting spectroscopic evidence for collective dipole and octupole deformations have appeared. Many theoretical attempts have been made to explain the observed spectroscopic properties in terms of stable octupole deformations. The coupling by the octupole potential, being proportional to Y_{30}, is strongest for those subshells for which $\Delta l = 3$. Therefore the tendency towards octupole deformation occurs just beyond closed shells where the high-j intruder subshells (N,l,j) lie very close to the normal parity subshells (N-1,l-3,j-3), i.e. for the particle numbers 34 (g/sub 9/2/-p/sub 3/2/), 56 (h/sub 11/2/-d/sub 5/2/). 9C (i/sub 13/2/-f/sub 7/2/) and 134 (j/sub 15/2/-g/sub 9/2/). Empirically, it is specifically for the particle numbers listed above that negative parity states are observed at relatively low energies in doubly even nuclei. From the different combinations of octupole-driving particle numbers four regions of likely candidates for octupole deformed equilibrium shapes emerge, namely the neutron-deficient nuclei with $Z \approx 90$, $N \approx 134$ (light actinides) and $Z \approx 34$, $N \approx 34$ ($A \approx 70$) and the neutron-rich nuclei with Z approx. = 56, $N \approx 90$ (heavy Ba) and $Z \approx 34$, N^{56} ($A \approx 90$). In our calculations we searched for octupole unstable nuclei in these four mass regions. The Strutinsky method with the deformed Woods-Saxon potential was employed. The macroscopic part consists of a finite-range liquid drop energy, where both the surface and Coulomb terms contain a diffuseness correction.

32109 (INIS-mf—8365, pp 31-33) **CCBA analysis of 13/2$^+$ levels in ^{145}Sm.** Seichert, N.; Clement, H.; Graw, G.; Merz, F.; Schiemenz, P. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32110 (INIS-mf—8935, pp 193-196) **Excitation of dibaryon resonances in deuteron nucleus collisions.** Rosina, M. (Ljubljana Univ. (Yugoslavia). Fakultet za Naravoslovje in Tehnologijo). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The possibility of exciting deuteron into dibaryon resonances is discussed using a mean field model for peripheral collisions. (author).

32111 (INIS-mf—8935, pp 269-274) **4PI data of relativistic nuclear collisions.** Gutbrod, H.H.; Gustaffson, H.A.; Kolb, B. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.); California Univ., Berkeley (USA). Lawrence Berkeley Lab.) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The Plastic Ball, the first electronic nonmagnetic particle identifying four-pi spectrometer, was used to evaluate complete events of relativistic nuclear collisions. The large multiplicities of events and the electronic data acquisition and processing system gave a very large amount of data. Computer selection and further processing led to reliable evaluated results. In the present paper a part of them, concerning stopping and thermalization in relativistic heavy ion collisions are reported. Some considerations on composite particle and entropy production in connection with a possible phase transition in nuclear matter are described.

32112 (INIS-mf—8935, pp 275-279) **Global analysis of relativistic nuclear collisions detected by the Plastic Ball.** Ritter, H.G.; Gustafsson, H.A.; Gutbrod, H.H. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.); California Univ., Berkeley (USA). Lawrence Berkeley Lab.) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Event shapes and emission patterns of high energy nuclear collisions are investigated using data from the electronic four-pi detector Plastic Ball. The sphericity parameter of reaction products, successfully used in particle physics is applied to the study of nuclear collisions. Analysis of sphericity tensors derived from Plastic Ball data does not indicate flow in the symmetric mass 40 system. Rapidity plots show ambiguous results.

32113 (INIS-mf—8935, pp 281-286) **Two particle correlations observed with the Plastic Ball detector.** Wieman, H.; Gutbrod, H.H.; Gustafsson, H.A. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.); California Univ., Berkeley (USA). Lawrence Berkeley Lab.) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Two-particle correlations are investigated using data of relativistic heavy ion reactions measured by the Plastic Ball, the electronic four-pi spectrometer. Two-pion and proton-proton correlations have been measured and interference effects were analyzed. The center-of-mass energy of the correlated particle pair was in the order of 0.5 MeV. In the 1-10 MeV center-of-mass energy range the nuclear cluster formation was investigated and nuclear composites, unstable isotopes were observed. In the cores of the lightest nuclei the sign of correlation was determined.

32114 (INIS-mf—8935, pp 433-437) **Λ and Ksub(s)sup(o) production in central nucleus-nucleus interactions at 4.5 GeV/c momentum per nucleon.** Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Strange particle production is experimentally investigated in central nucleus-nucleus collisions. The production of strangeness is due to the highly excited states of the nuclear matter. Neutral lambda and K particles are reported in central collisions of C and O projectiles of 4.5 GeV/c/amu with nuclear targets C, Ne, Cu, Zr and Pb. The data are consistent with the results of inelastic He-Li collisions which can be interpreted as a superposition of independent nucleon-nucleon interactions. (D.Gy.).

32115 (INIS-SU—198, pp 198) **Quantum kinetic equation in magic nuclei with account for "1p1h + phonon" configuration.** Kamerdzhiev, S.P. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32116 (INIS-SU—198, pp 301) **INTERMEDIATE STRUCTURE OF EMISSION ENERGY SPECTRA IN PRE-EQUILIBRIUM REACTIONS WITH NUCLEONS.** DEB, A.K.; ZHIVOPISTSEV, F.A.; SUKHAREVSKIJ, V.G.; KHAJMIN, V.A. 1983. (IN RUSSIAN). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—SUMM.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32117 (INIS-SU—198, pp 82) **Intensity distribution of gamma transitions in ^{110}Ag nuclei.** Sushkov, P.A. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32118 (INIS-SU—198, pp 88) **Study on the ^{129}Ce, ^{131}Ce and ^{131}Pr decay.** Akhmonen, A.A.; Vitman, V.D.; Moroz, F.V.; Orlov, S.Yu.; Tarasov, V.K. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32119 (INIS-SU—198, pp 89) **Internal conversion electrons in sup(131)La decay.** Abdurazakov, A.A.; Gromov, K.Ya.; Islamov, T.A.; Kononenko, G.A.; Lebedev, N.A.; Kholmatov, A.Kh. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32120 (INIS-SU—198, pp 293) **Calculations of proton scattering cross sections using statistical theory.** Gusev, V.P.; Zarubin, P.P. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32121 (INIS-SU—198, pp 265) **Nuclear orientation of ^{149}Pm.** Lebedev, N.A.; Prokhazka, I.; Shigechek, P.; Finger, M.; Badzhelidze, M.G.; Ehkhn, L.; Yanout, Z. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32122 (INIS-SU—198, pp 347) **Photon scattering by atomic nuclei in the region of photonucleon reaction threshold.** Alimov, A.S.; Piskarev, I.M.; Sorvin, V.M. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32123 (JINR—6-83-235) **Low-lying excited states of ^{128}Xe.** Mikha lova, M.M.; Zhelev, Zh.; Kirova, N.; Vylov, Ts.; Novgorodov, A.F. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1983. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701700.

Conversion-electron and γ-ray spectra from the decay of ^{128}Cs have been measured employing high resolution Ge(Li) and Si(Li)-detectors with various sensitive volumes. Multipolarities of eleven γ-transitions were obtained. Spins and parities determined for the lowest excited states are discussed. On the basis of the calculated parameter of deviation from the symmetry from the Davydov-Chaban mode, for which 20 deg <= γ <= 25 deg is obtained, the conclusion as to the γ-softness of the nucleus under study is drawn.

32124 (JINR—R-1-83-201) **Multiplicity distributions of protons with intermediate energies and of fast charged particles emitted in interactions of π-mesons and protons with atomic nuclei in 1.6-10.5 GeV energy range.** Mulas, E.; Slowinski, B. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1983. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701694.

Multiplicity distributions of protons with intermediate energy (E > or approximately 30 MeV) and multiplicity distribution of n -isub(s) fast charged particles with β > 0.37, emitted in interactions pXe at 2.34 GeV/c and π^-Xe at 9 GeV/c have been measured. The dependence of average multiplicity < nsub(s) > on the proton multiplicity and beam energy are presented. The obtained data are compared with corresponding results for nuclear cascade calculations and KNO scaling function. It has been pointed out that intranuclear cascade model does not contradict the experimental data and that the KNO formula satisfactorily described nsub(s) multiplicity distribution of relativistic charged particles. The dependence of average multiplicity < nsub(s)(k) > on primary hadron energy suggests that relativistic particles nsub(s) are essentially emitted at the first collision of hadron in the target-nucleus.

32125 (UCRL—90806) **Time dependent Hartree-Fock theory: special applications.** Weiss, M.S. (Lawrence Livermore National Lab., CA (USA)). 17 May 1984. Contract W-7405-ENG-48. 23p. (CONF-8403126—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012319.

From Winter school on fundamental nuclear physics; Trieste, Italy (11 Mar 1984).

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Some TDHF applications are addressed that are somewhat subtler than just crashing nuclei together and looking at large chunks of nuclear material. I will also attempt to address some of the technical problems of doing TDHF and also point out some areas where work remains to be done. Topics include promptly emitted particles, large amplitude RPA, and exciting giant resonances in heavy ion collisions. 19 references. (WHK)

32126 **Microscopic look at the nuclear twist.** Schwesinger, B. (Institut fuer Kernphysik, Kernforschungsanlage Juelich, D-5170 Juelich, Federal Republic of Germany and Department of Physics, State University of New York at Stony Brook, Stony Brook, New York 11794). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1475-1481(Apr 1984). Contract AC02-76ER13001.

For ^{90}Zr and ^{208}Pb a microscopic one-particle-one-hole plus two-particle-two-hole calculation examines fluid dynamical predictions about a collective twist resonance in finite nuclei at E~45A/ sup -1/3/ MeV. A spin flip mode which strongly competes with the twist in experiments is heavily fragmented, thus allowing experimental detection of the twist.

6518 Nuclear Properties And Reactions, A=150-189

32127 (INIS-mf—8365, pp 51-52) **Favoured β-transitions πhsub(11/2)->vhsub(9/2).** Korschinek, G.; Nolte, E.; Setzensack, C. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32128 (INIS-mf—8365, pp 71-72) **Approximate angular momentum projection for strongly deformed nuclei.** Mutz, U.; Mang, H.J.; Ring, P. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32129 (INIS-mf—8365, pp 73-74) **New collective states in deformed nuclei.** Hilton, R.R. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32130 (INIS-SU—198, pp 118) **Nonadiabatic effects of residual interactions in ^{154}Eu.** Guseva, T.V.; Tamberg, Yu.Ya.; Balodis, M.K. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32131 (INIS-SU—198, pp 135-136) **Coriolis force effect on electromagnetic properties of rotational bands of ^{171}Yb.** Kvasil, Ya.; Kratsikova, T.I.; Davaa, S.; Finger, M.; Choriev, B. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32132 (INIS-SU—198, pp 137) **Soft gamma radiation spectrum in the ^{171}Lu decay.** Artamonova, K.P.; Valiev, F.F.; Grigor'ev, E.P.; Zolotavin, A.V.; Sergeev, V.O. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32133 (INIS-SU—198, pp 144) **Sup(181)W decay.** Dzhelepov, B.S.; Dranitsyna, G.F. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32134 (INIS-SU—198, pp 345) **Photoexcitation of 18-microsecond isomeric state in ^{181}Ta by bremsstrahlung of 3-4 MeV electrons.** Dubenskij, A.P.; Dubenskij, V.P.; Sokolova, E.A. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32135 **Long lifetimes through the backbend in ^{168}W.** Dracoulis, G.D.; Sprouse, G.D.; Kistner, O.C.; Rafailovich, M.H. (Department of Physics, State University of New York at Stony Brook, Stony Brook, New York 11794). *Physical Review* [*Section*] *C: Nuclear Physics;* **29**: No. 4, 1576-1579(Apr 1984).

Lifetimes in ^{168}W have been measured using the recoil distance method. The lifetime of the 12^+ yrast state (at the backbend) is 87.4(3.3) ps. The 14^+ yrast state has a lifetime of 38.3(1.5) ps. These unusually long lifetimes make ^{168}W a particularly favorable case for studying the structure in the backbending region. The B(E2) of the $12^+ \rightarrow 10^+$ yrast transition is retarded by a factor of 50 compared with the rotational value. The transition quadrupole moments for the observed yrast and yrare states are used to deduce a yrast-yrare interaction of $10<V<19$ keV, in agreement with cranked shell model calculations.

32136 **^{154}Eu(t, p) reaction: Some new systematics in the N = 90 spherical-deformed transition region.** Lanier, R.G.; Sheline, R.K.; Struble, G.L.; Mann, L.G.; Cizewski, J.A. (California Univ., Livermore). *Nuclear Physics* [*Section*] *A;* **413**: No. 2, 236-246(30 Jan 1984).

A radioactive target of ^{154}Eu(8.3 γ) has been used to study the ^{154}Eu(t,p)^{156}Eu reaction at an incident energy of 17 MeV. The bandhead and one rotational state of the [π 5/2[413]; ν 11/2[505]]sub(K=3-) configuration have been identified in ^{156}Eu. The excitation energy of the 3^- bandhead is determined to be 448 +- 15 keV. The angular distribution of the first excited rotational state is anamolous and may indicate evidence for a strong two-step component in the reaction mechanism. The energy systematics of the Eu-Sm transition region are also investigated. We find that the systematics of $(\hbar/2\pi)/2F$ suggest that at N = 87 the ^{150}Eu [π 5/2[413]; ν 11/2[505]]sub(K=3-) excited configurations has a significantly more stable deformed structure than the corresponding 11/2[505] one-quasiparticle structure in ^{149}Sm.

6519 Nuclear Properties And Reactions, A=190-219

REFER ALSO TO CITATION(S) 32126, 32238

32137 (INIS-mf—8365, pp 69-71) **Triaxial ground state deformations in transitional nuclei.** Hayashi, A.; Hara, K.; Ring, P. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32138 (INIS-mf—8365, pp 68) **Fission barriers of compressed nuclei.** Stocker, W. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32139 **(INIS-mf—8739) Study of the reaction mechanisms in the system ^{20}Ne + ^{197}Au at projectile energies between 7.5 and 20 MeV/u.** Egelhaaf, C. (Freie Univ. Berlin (Germany, F.R.). Fachbereich Physik). 22 Dec 1982. 107p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780277.

In the present thesis the system ^{20}Ne + ^{197}Au was studied at projectile energies of 150, 220, 290 and 400 MeV. Energy and angular distributions of the projectile-like fragments, the light particles, and the fission fragments were measured. From the comparison of the fission cross section and the cross section of the projectile-like fragments it turned out that these two contributions supplement mutually to the reaction cross section which was determined by calculations by means of the optical model. Both contributions have to be assigned to mutually independent reaction types. In the second part the measured data are compared with different models (Qgg systematics, models for the optimal Q value, for projectile fragmentation and sequential emission of light particles). Thereby result following results: Evidence for the projectile fragmentation as it was described by Gelbke et al. (1977) couldn't be found, rather the sequential emission of light particles increasing with growing projectile energy.

32140 (INIS-mf—8935, pp 307-310) **Search for flow in the reaction Ar+Pb.** Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The mechanisms of interactions between Ar projectiles and Pb targets were investigated at the Berkeley BEVALAC. All charged particles produced in the collisions were recorded by the Streamer Chamber. The events were triggered by hardware. The observed energy dependence, momentum transfer and angular distribution were compared with the predicitons of intranuclear cascade model. The experimental results, however, contradict to that model and point towards the hydrodynamical flow model but the latter has not been yet comparable with the observed data.

32141 (INIS-SU—198, pp 258) **Energy spectra of positrons and electrons produced in lead target by bremsstrahlung beam.** Nikol'skij, M.Yu.; Piskarev, I.M.; Sorvin, V.M. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32142 **(JINR—1-83-22) Multiplicity distributions of πp mesons produced in light nuclei interaction with tantalum nuclei for momentum interval 2-5 GeV/c per nucleon.** Agakishiev, G.N.; Baatar, Ts.; Gasparyan, A.P.; Grigalashvili, N.S.; Ivanovskaya, I.A.; Kladnitskaya, E.N.; Mekhtiev, R.R.; Cheplakov, A.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701699.

Multiplicity distributions of π^- mesons produced in inelastic collisions of deuterium, helium and carbon nuclei with tantalum target are presented for momentum interval 2-5 GeV/c per nucleon. Experimental data are obtained by means of 2-metre propane bubble chamber of the Laboratory of High Energies, JINR. In He-Ta interactions at 5.1 GeV/c and in the C-Ta interactions at 4.2 GeV/c distributions are wider than the Poisson one. Dependence of average multiplicity of π^--mesons on the primary energy and atomic weight of the projectile is also presented. In central collisions of nuclei the distributions are close to the Poisson one.

32143 **3291-keV J/sup π/ = (25/2)$^+$ level in ^{205}Tl.** Becker, J.A.; Lanier, R.G.; Mann, L.G.; Struble, G.L.; Maier, K.H.; Ussery, L.E.; Stoeffl, W.; Nail, T.W.; Sheline, R.K.; Cizewski, J.A. . (Lawrence Livermore National Laboratory, Livermore, California 94550). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1268-1272(Apr 1984).

A J/sup π/ = (25/2)$^+$ isomer in ^{205}Tl has been observed using techniques of in-beam γ-ray spectroscopy and the ^{204}Hg(t,2n)^{205}Tl reaction. The decay scheme firmly establishes the yrast levels: [J/sup π/,E/sub x/ (keV)] (11/2)$^-$, 1484.02; (15/2)$^-$, 2054.57; (17/2)$^-$, 2394.18; (19/2)$^-$, 2551.56; and (25/2)$^+$, 3290.7. A candidate for a 12$^-$ state in ^{204}Tl with the configuration (πh/sub 11/2/ $^{-1}$, νi/sub 13/2/ $^{-1}$) is identified.

32144 **Evaporation decay and associated gamma multiplicity for ^{204}Rn via three fusion channels.** Rohe, R.; DiRienzo, A.; Enge, H.; Salomaa, M.K.; Smith, A.; Schier, W.; Tsoupas, N.; Wegner, H.E. (Massachusetts Institute of Technology, Laboratory for Nuclear Science, Cambridge, Massachusetts 02139). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1362-1369(Apr 1984).

Near-barrier excitation functions for 2n, 3n, 4n, 5n, 2n1p, 3n1p, and 4n1p evaporation from ^{204}Rn following the fusion of ^{35}Cl+ ^{169}Tm, ^{48}Ti+ ^{156}Gd, and ^{65}Cu+ ^{139}La are compared between reactions and with statistical decay codes. First and second gamma multiplicity moments were obtained for all three systems at 50 MeV excitation energy. General agreement with statistical decay code predictions is found in all cases.

32145 **Inelastic excitation of giant resonances by 400-MeV ^{16}O.** Sjoreen, T.P.; Bertrand, F.E.; Auble, R.L.; Gross, E.E.; Horen, D.J.; Shapira, D.; Wright, D.B. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1370-1376(Apr 1984).

Results are presented for 350- and 400-MeV ^{16}O inelastic scattering from ^{208}Pb and ^{90}Zr. The results show excitation of the giant quadrupole, monopole, and dipole resonances. The cross section and peak to continuum ratio are very large for the giant quadrupole resonance. Measured angular distributions agree with distorted-wave Born approximation calculations which use standard collective model form factors. Structure observed in the ^{16}O spectra corresponding to high excitation energies in ^{208}Pb is shown to arise from projectile pickup reactions.

6520 Nuclear Properties And Reactions, A=220 And Above

32146 **(EPRI-NP—3436) Neutron multiplicities of ^{252}Cf and the fissile nuclei. Final report.** Smith, J.R.; Reeder, S.D.; Gehrke, R.J. (EG and G Idaho, Inc., Idaho Falls (USA)). Mar 1984. 226p. EPRI-RRC, Box 50490, Palo Alto, CA 94303. Order Number TI84920322.

The absolute value of anti nu, the average number of fission neutrons emitted per fission event, has been measured for the nuclear standard ^{252}Cf, using the manganese bath technique. The fission rate of the ^{252}Cf source was determined by observing coincindences between neutron and fission events. The neutron yield of the source was measured by use of a cablibrated manganese bath. The value obtained was anti nu = 3.767 +- 0.010 neutrons per fission. In a further study of neutron multiplicities the manganese bath measurements of eta, the average number of fission neutrons produced per neutron absorbed in a fissile nucleus, were reanalyzed using estimates of manganese bath systematic effects consistent with those used in the analysis of the ^{252}Cf anti nu data. Part 3 of the report is a reanalysis of relative eta measurements made with a small manganese bath at a few energy points between 0.06 and 0.026 eV, for the nuclei ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu. Part 4 describes a corrected analysis of total cross section measurements for ^{241}Pu, in the neutron energy interval 0.0005 to 0.10 eV. 70 references.

32147 **(INDC(IRN)—003/L) Measurement of the ^{235}U/^{238}U fission cross section ratio in the ^{235}U fission neutron spectrum.** Azimi-Garakani, D.; Bagheri-Darbandi, M. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Jun 1983. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701829.

Fission cross section ratio of ^{235}U to ^{238}U has been measured in the fast neutron field generated by the ^{235}U fission plate installed on the thermal column of the Tehran Research Reactor (TRR) with a Makrofol solid state nuclear track detector. The experiments were carried out with a set of total six enriched ^{235}U and depleted ^{238}U deposits with different masses and Makrofol films of 0.025mm and 0.060mm thicknesses. The chemically etched tracks were counted by an optical microscope. No significant differences were observed with the thin and the thick films. The results showed that the average fission cross section ratio is 3.83+-0.25.

32148 (INIS-mf—8365, pp 58-61) **Observation of a narrow line in the positron spectra from U + U and U + Th collisions.** Berdermann, E.; Bosch, F.; Clemente, M.; Kienle, P.; Koenig, W.; Kozhuharov, C.; Tsertos, H.; Wagner, W. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

The observation of partly narrow lines in the positron spectra (see AR 1981) could be confirmed by further of the pair production in ^{238}U-^{238}U and ^{238}U-^{232}Th collisions for incident energies near the Coulomb barrier (5.7-6.2 MeV/u).

32149 (INIS-mf—8365, pp 74) **Quadrupole vibrations of ^{238}U in collective transport theory.** Jensen, A.S.; Leffers, J.; Reese, K.; Hofmann, H.; Siemens, P.J. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32150 (INIS-mf—8365, pp 49-50) **High-spin states in ^{230}Th.** Lauterbach, C.; Boer, J. de; Mittag, C.; Riess, F.; Schandera, C.; Briancon, C.; Lefebvre, A.; Simon, R.S. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32151 (INIS-mf—8962, pp C4) **Neutron interferrometric determination of the coherent scattering length of thorium.** Boeuf, A. (Commission of the European Communities, Ispra (Italy). Joint Research Centre; Institut Max von Laue - Paul Langevin, 38 - Grenoble (France)); Caciuffo, R.; Rustichelli, F. (Ancona Univ. (Italy)); Fournier, J.M. (CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France). Dept. de Recherche Fondamentale); Kischo, V. (Institut Max von Laue - Paul Langevin, 38 - Grenoble (France)); Manes, L. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements). 1983. NTIS (US Sales Only), PC A03/MF A01. Order Number TI84780364. (CONF-8304147—Summ.).

From 13. meeting on actinides; Elat, Israel (26 Apr 1983).

32152 **(JINR—R-7-83-91) Short-lived spontaneously fissioning activities produced at the sup(20, 22)Ne ion interaction with ^{249}Bk and ^{249}Cf target nuclei.** Buklaonov, G.V.; Derin, A.G.; Rubinsksya, L.A.; Saga dak, R.N.; Utenkov, V.K.; Shirokovskij, I.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1983. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701698.

The production of spontaneously fissioning (SF) activities in the interaction of sup(20, 22)Ne ions with ^{249}Bk and ^{249}Cf target nuclei was investigated. The described technique allows one to detect S. F. products with the lifetimes from tens of milliseconds up to several seconds and effective suppression of the long-lived background from the products of the multinucleon transfer reactions. Spontaneous fission activities with Tsub(1/2) approximately 1-3 s and rather large production cross sections (approximately 10^{-32} cm^2) are found to originate from the irradiation of ^{249}Bk, ^{249}Cf targets with sup(20, 22)Ne ions. The analysis of their sources makes it possible to point out ^{252}102 and ^{256}102 nuclides as the most probable in ^{249}Cf+^{22}Ne reaction, ^{253}102 and ^{246}Fm in ^{249}Bk+^{20}Ne reaction and unknown ^{257}Es and ^{260}Md in ^{249}Bk+^{22}Ne reaction. It is shown that in the multinucleon transfer reactions on actinide target nuclei nuclides in a wide range of mass numbers may be produced.

32153 **High-spin consequences of octupole shape in nuclei around ^{222}Th.** Nazarewicz, W.; Olanders, P.; Ragnarsson, I.; Dudek, J.; Leander, G.A. (Department of Mathematical Physics, Lund Institute of Technology, S-2200 07 Lund, Sweden). *Physical Review Letters;* **52**: No. 15, 1272-1275(9 Apr 1984). Contract AC05-76OR00033.

The effect of an octupole component in the intrinsic mean field at high spin is demonstrated by a Woods-Saxon-Bogolyubov cranking calculation. The nature of nuclear rotation becomes nearly collective instead of collective plus single-particle, because octupole couplings with Δl up to 3 "dilute" the high-j shells. Theory is consistent with experimental data on ^{223}Th and could be tested further by studying the properties of rotating quasiparticles in neighboring odd-mass nuclei.

32154 **Nuclear structure of ^{244}Am investigated with the (n,γ) reaction.** von Egidy, T.; Hoff, R.W.; Lougheed, R.W.; White, D.H.; Boerner, H.G.; Schreckenbach, K.; Warner, D.D.; Barreau, G.; Hungerford, P. (Physik-Department, Technische Universitat Muenchen, 8046 Garching, Federal Republic of Germany and Lawrence Livermore National Laboratory, Livermore, California 94550). *Physical Review* [*Section*] *C: Nuclear Physics;* **29**: No. 4, 1243-1267(Apr 1984).

Secondary gamma rays and conversion electrons following the ^{243}Am(n,γ)^{244}Am reaction have been studied with crystal spectrometers and an electron spectrometer, respectively. Primary gamma rays following thermal neutron capture in ^{243}Am have also been measured. A level scheme of ^{244}Am has been constructed containing 67 excited levels. The levels are interpreted in terms of coupled proton and neutron Nilsson configurations. The results are found to be in good agreement with a semiempirical model with which excitation energies in odd-odd nuclei are calculated from those in adjacent nuclei.

32155 **Alpha-decay properties of ^{247}Cf, ^{248}Cf, ^{252}Fm and ^{254}Fm.** Ahmad, I.; Lerner, J.L. (Argonne National Lab., IL). *Nuclear Physics* [*Section*] *A;* **413**: No. 3, 423-431(6 Feb 1984).

Alpha-decay properties of ^{247}Cf, ^{248}Cf, ^{249}Fm and ^{254}Fm were measured using thin mass-separated sources. Alpha spectra were measured with Au-Si surface barrier detectors and a magnetic spectrometer, and these were used to determine energies and intensities of α-groups. The energies and intensities are: 6.296 (95%), 6.238 (5%) in ^{247}Cf decay; 6.258 (80.0%), 6.217 (19.6%), 6.118 (0.4%) in ^{248}Cf decay; 7.039 (84.0%), 6.998 (15.0%), 6.904(0.97%), 6.759 (0.023%) in ^{252}Fm decay; 7.192 (85.0%), 7.150 (14.2%), 7.050 (0.82%), 6.898 (0.0066%) in ^{254}Fm decay. Gamma-ray spectra of mass-separated ^{252}Fm and ^{254}Fm samples were measured with a high-resolution Ge(Li) spectrometer, and the $2^+ \rightarrow 0^+$ and $4^+ \rightarrow 2^+$ transitions were observed in the decays of both nuclei. The half-lives of ^{247}Cf and ^{252}Fm were measured to be 3.11 +- 0.03 h and 25.39 +- 0.04 h, respectively. The α branching ratio α/(α + EC) for ^{247}Cf was found to be (3.5 +- 0.5) x 10^{-2}% and the fission /α ratio was measured to be (2.3 +- 0.2) x 10^{-3}% which corresponds to a fission half-life of 125 +- 8 y.

32156 **Sensitivity of computed uranium-238 self-shielding factors to the choice of the unresolved average resonance parameters.** Munoz-Cobos, J.L.; de Saussure, G.; Perez, R.B. (Oak Ridge National Laboratory, P.O. Box X, Bldg. 6025 Oak Ridge, Tennessee 37830). *Nuclear Science and Engineering;* **81**: No. 1, 55-65(May 1982).

The influence of different representations of the unresolved resonances of ^{238}U on the computed self-shielding factors is examined. It is shown that the evaluated infinitely diluted average capture cross section does not provide sufficient information to determine a unique set of unresolved resonance parameters; different sets of unresolved resonance parameters equally consistent with the evaluated average capture cross section yield significantly different computed self-shielding factors. In the conclusion it is recommended that the resolved resonance description of the evaluated ^{238}U cross sections be extended to higher energies and that thick sample transmission data and self-indication data be used to improve the evaluation of the unresolved resonance region.

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REFER ALSO TO CITATION(S) 32018, 32095, 32108, 32125, 32129, 32149

32157 **(BARC—1161) Heavy ion elastic scattering code : OPTHI.** Ismail, M.; Divatia, A.S. (Bhabha Atomic Research Centre, Bombay (India)). 1982. 30p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701745.

A computer code, OPTHI has been designed to calculate nuclear optical model elastic cross sections for the scattering of heavy ions. The program has been designed to be utilitarian rather than capable of giving an exact description of elastic scattering. Input format is described and the program listing is given.

32158 **(INIS-mf—8347) HFB+nQP-method for the description of the rotational bands of deformed nuclei.** Schlicht, G. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Naturwissenschaftliche Fakultaet 1 - Mathematik und Physik). 21 Jul 1982. 134p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number TI84780232.

The HFB+nQP methods has been developed which is presented in this thesis and studied regarding its quality as approximation procedure. For even-odd nuclei the results of the HFBRC-, the HFB+1QP, and the HFB+3QP method were compared with those of the exact solution. As criteria the energy plots, the K distributions, the <j^{2}sub(p3)> and the <jsub(p)^2>-expectation values were applied. Hereby it has been shown that the HFB+1QP method is the fasted approximation for the particle+rotor model. An underlying backbending, i.e. the breakup of a i13/2 pair, which can occur for J>=21.5 is clearly recognizable both in the energy plots and the K distributions and the <j^{2}sub(p3)>-expectation values. The dependence of the results of the particle+rotor model from the parameters could be examined by the study of the 1QP- and the 2QP-data field. The author was therefore able to fit the three following dysprosium nuclei ^{157}Dy, ^{159}Dy, and ^{161}Dy by the HFB+3QB method. Thereby it has been shown that the parameters of the three nuclei only differ in the moment of inertia and the particle number parameter. (orig./HSI).

32159 (INIS-mf—8365, pp 65) **General theory of nuclear non-equilibrium systems. Statistical equations and 'nuclear hydrodynamics'.** Weigel, M.K.; Winter, J. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32160 (INIS-mf—8365, pp 68) **Coupling of surface and bulk vibrations in the nuclear breathing mode.** Brack, M. (Regensburg Univ. (Germany, F.R.)); Stocker, W. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32161 (INIS-mf—8365, pp 69) **Giant dipole resonance in hot rotating nuclei.** Faber, M.E.; Egido, J.L.; Ring, P. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32162 (INIS-mf—8365, pp 69) **Microscopic formulation of interacting fermion-boson systems.** Gambhir, Y.K.; Ring, P.; Schuck, P. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32163 (INIS-mf—8365, pp 72) **Rotating giant dipole mode.** Hilton, R.R. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32164 (INIS-mf—8365, pp 72-73) **Super-backbending.** Hilton, R.R.; Mang, H.J. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32165 (INIS-mf—8365, pp 74) **Nuclear collective coordinates as quantum variables and a self-consistent description of damped vibrations.** Hofmann, H. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32166 (INIS-mf—8365, pp 74) **Damping of nuclear collective motion.** Jensen, A.S.; Hofmann, H.; Siemens, P.J. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32167 (INIS-mf—8365, pp 77-78) **Emission of light fragments in the transport model for nucleus-nucleus collisions at high energies.** Malfliet, R.; Martschew, E.; Schuermann, B. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32168 (INIS-mf—8365, pp 81) **Description of continuum spectra in reactions with light ions by direct multi step processes.** Tamura, T.; Udagawa, T.; Lenske, H. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32169 (INIS-mf—8365, pp 83-84) **Approximations for direct multi-step reaction theories.** Lenske, H.; Papageorgiou, E.; Wolter, H.H.; Tamura, T. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32170 (INIS-mf—8365, pp 85) **Effective interaction for direct transfer reactions.** Dasso, C.H.; Landowne, S.; Wolter, H.H. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32171 (INIS-mf—8365, pp 66) **Nuclear matter calculations within the quasi-Hartree-Fock-theory.** Weber, F.; Weigel, M.K.; Winter, J. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32172 (INIS-mf—8365, pp 68) **Collective mode including the spin degree of freedom.** Lenske, H.; Stocker, W. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32173 (INIS-mf—8365, pp 84) **Investigating the pairing phase transition in rapidly rotating deformed nuclei with heavy ion two-nucleon transfer reaction.** Dasso, C.H.; Landowne, S.; Broglia, R.A.; Winter, A. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32174 (INIS-mf—8365, pp 67) **Semi-classical description of giant resonances in rotating nuclei.** Winter, J. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32175 (INIS-mf—8365, pp 75) **Fission dynamics simplified.** Hofmann, H.; Nix, J. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32176 (INIS-mf—8365, pp 75) **Propagation of a fissioning system across the barrier towards scission.** Scheuter, F.; Hofmann, H. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32177 (INIS-mf—8365, pp 75) **Use of a transport equation for the dynamical behaviour of the nuclear fission.** Scheuter, F.; Gregoire, C. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32178 (INIS-mf—8365, pp 76) **Macroscopic equation of motion including quantum mechanical and non-Markoff processes.** Scheuter, F.; Hofmann, H. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32179 (INIS-mf—8365, pp 76) **Pion absorption compared to effects of compression in relativistic nucleus-nucleus collisions.** Malfliet, R.; Schuermann, B. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32180 (INIS-mf—8365, pp 77) **Mass dependence of the inclusive proton cross section for nucleus-nucleus collisions of high energies.** Mankoc-Borstnik, N.; Schuermann, B. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32181 (INIS-mf—8365, pp 78-80) **Scaling behaviour in a hydrodynamical description of heavy ion reactions.** Balazs, N.; Dietrich, K.; Schuermann, B. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32182 (INIS-mf—8365, pp 80) **Charge transfer prior to fusion.** Hartmann, K.M.; Gross, D.H.E. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32183 **(INIS-mf—8719) Odd-even effects in the nuclear fission.** Metzner, R. (Heidelberg Univ. (Germany, F.R.). Naturwissenschaftlich-Mathematische Gesamtfakultaet). [nd]. 54p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84780228.

The experimental values were reproduced for the odd-even effect for all even-charged nuclei from thorium to californium. Partly the OE-effect was studied in spontaneous fission, partly in neutron induced fission with thermal, 1.9-, and 3.0- MeV neutrons. It was shown that the calculated values depend very strongly from the one-particle model which is assumed in order to calculate the probabilities for pairing excitations. Thereby not only the steepness plays a role with which the one-particle energies cross the Fermi edge, but also the deformation velocity, and finally the remaining time until the scission point. That means that the whole procedure depends extremely from details of the one-particle model. Different one-particle models can be excluded because they contain simply too many crossings and then the OE effect tends to O. (orig./HSI).

32184 **(INIS-mf—8730) Collective mass and zero-point energy in the generator-coordinate method.** Fiolhais, C. (Frankfurt Univ. (Germany, F.R.). Fachbereich Physik). 20 Dec 1982. 113p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE84780227.

The aim of the present thesis is the study of the collective mass parameters and the zero-point energies in the GCM framework with special regards to the fission process. After the derivation of the collective Schroedinger equation in the framework of the Gaussian overlap approximation the inertia parameters are compared with those of the adiabatic time-dependent Hartree-Fock method. Then the kinetic and the potential zero-point energy occurring in this formulation are studied. Thereafter the practical application of the described formalism is discussed. Then a numerical calculation of the GCM mass parameter and the zero-point energy for the fission process on the base of a two-center shell model with a pairing force in the BCS approximation is presented. (HSI).

32185 **(INIS-mf—8746) Collectivity and statistics in deeply-inelastic heavy-ion collisions.** Spina, M.E. (Heidelberg Univ. (Germany, F.R.). Naturwissenschaftlich-Mathematische Gesamtfakultaet). 1983. 99p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84780368.

A model is developed to describe the transformation of relative kinetic energy into intrinsic excitation energy in DIC. Energy dissipation is viewed as an indirect process, in which collective vibrational modes are first excited coherently and then damped due to the coupling to the remaining non-collective degrees of freedom. Both collective and intrinsic degrees of freedom are included explicitly, and the coupling between them is treated in a Random Matrix Model. Under certain assumptions it is shown that, in the weak-coupling limit, the collective probability distribution in phase space obeys a Fokker-Plank equation. This transport equation is used to derive equations of motion for the expectation values of some "macroscopic" quantities characterizing the process. Some numerical results are presented and a qualitative comparison with the Copenhagen model is attempted.

32186 (INIS-mf—8935, pp 57-63) **Nuclear structure and hypernuclei.** Zofka, Jan (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Methods of formation of hypernuclei are briefly reviewed. The nuclear structure and related information content is commented. (author).

32187 (INIS-mf—8935, pp 65-72) **Probability of hypernucleus production in high-energy heavy-ion collisions.** Asai, F. (Osaka Univ., Toyonaka (Japan). Dept. of Physics); Bando, H. (Fukui Univ. (Japan)); Sano, M. (Tokyo Univ. (Japan)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

A coalescence model is used to estimate hyperfragment production probability in heavy ion collisions. Authors concluded that hyperfragments could be formed with reasonable cross sections. (author).

32188 (INIS-mf—8935, pp 113-120) **Pomeron colour structure and hadron scattering on the six-quark deuteron configuration.** Kopeliovich, B.Z. (Joint Inst. for Nuclear Research, Dubna (USSR)); Zacharov, B.G. (AN SSSR, Moscow. Inst. Fiziki Zemli). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The pomeron color structure provides some contribution to the elastic hadron-deuteron amplitude which is not contained in the Glauber like approach. This contribution is very sensitive to the deuteron wave function at short distances and poses one to fix with a high precision a size of the six-quark bag in the deuteron. (author).

32189 (INIS-mf—8935, pp 159-163) **Transition density for single charge-exchange scattering of pions.** Lovas, R.G. (Magyar Tudomanyos Akademia, Debrecen. Atommag Kutato Intezete). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

It is shown that the charge-exchange transition density gains non-negligible contributions from the self-conjugate core. While the Coulomb self-polarization of the core is only substantial for nuclei of large neutron excess, the core polarization due to the excess neutrons is appreciable for all non-self-conjugate nuclei. (author).

32190 (INIS-mf—8935, pp 547-555) **Inverse mean field method and solitons in nuclear physics.** Hefter, E.F. (Hannover Univ. (Germany, F.R.). Inst. fuer Theoretische Physik). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

A new method, similar to the inverse scattering method, is proposed to determine the unknown nuclear potential using the known energy levels of bound states. The inverse mean field method relates to soliton solutions of field equations. Preliminary results and possible applications of the new methods are presented.

32191 (INIS-mf—8935, pp 17-26) **Equilibrium between anisotropic normal and pion condensed nuclear matter.** Lovas, I. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics); Nemeth, J. (Lorand Eoetvoes Univ., Budapest (Hungary). Inst. for Theoretical Physics); Sailer, K. (Kossuth Lajos Tudomanyegyetem, Debrecen (Hungary). Kiserleti Fizikai Intezet). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The possible phase transition in nuclear matter is investigated theoretically in the framework of the relativistic field theory. The pion condensed phase at finite temperature and its thermody-

namic properties are described by quantum statistical mechanics. Anisotropics of the pion condensed phase and of the normal nuclear matter are studied. The conditions of equilibrium of these two phases are derived.

32192 (INIS-mf—8935, pp 27-37) **Fluctuations and defects in pion condensates and a possible new phase.** Kleinert, H. (Freie Univ. Berlin (Germany, F.R.). Inst. fuer Theorie der Elementarteilchen). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

A pion condensate as a layered structure has violent fluctuations with the critical phenomena at the transition being a consequence of the proliferation of line-like defects, just as in smectic A liquid crystals. The dominance of dislocations over disclinations suggests the existence of a new phase, prior to pion condensation, in which there is directional order without a periodic structure. (author).

32193 (INIS-mf—8935, pp 369-387) **Relativistic nuclear fluiddynamics coupled to classical meson fields.** Theis, J. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)); Graebner, G.; Maruhn, J.; Greiner, W. (Frankfurt Univ. (Germany, F.R.). Inst. fuer Theoretische Physik). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

For the purpose of studying high-energy heavy-ion collisions self-consistent theory of relativistic nuclear fluid-dynamics coupled to classical meson fields was developed. The essential difference to the conventional fluid dynamic description arises from the nonlinear relation for the effective baryon mass Msup(*). The properties of the resulting equation of state were examined and show a new type of phase transition at high temperatures. Finally, some exploratory three-dimensional calculations are presented. (author).

32194 (INIS-mf—8935, pp 489-494) **Quark-gluon plasma formation.** Gyulassy, M. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The production of high baryon density plasmas at 10 GeV/A and low baryon density plasmas at 1 TeV/A via nuclear collisions is discussed. (author).

32195 (INIS-mf—8935, pp 495-511) **Dynamical model of quark gluon plasma formation and disintegration.** Biro, T.S.; Zimanyi, J. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

A dynamic model is proposed to describe the quark gluon plasma formation and rehadronization during the heavy ion reactions. A geometric picture is used to determine the overlap region of colliding hadrons, where quarks and gluons form a non-confined plasma. Conservation laws are used to determine the thermodynamical parameters of the plasma. Formulas of the suggested quarkochemistry describe the evolution and flavor distribution of the fireball. A combinatorical model describes the rehadronization process. The particle composition of the disintegrated fireball is given. The minimal bombarding energy necessary to the formation of the quark gluon plasma is derived. (D.Gy.).

32196 (INIS-mf—8935, pp 513-519) **Evaporation of mesons from quark-gluon plasma by fission of chromoelectric flux tubes.** Glendenning, N.K.; Banerjee, B.; Matsui, T. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The chromoelectric flux tube model is used to obtain a dynamical description of the evaporation of mesons from a quark-gluon plasma. The radiation pressure is computed to assess whether this process is an important mode for the disassembly of a compressed plasma. A new result for the creation rate of qq pairs in a constant color field is employed. (author).

32197 (INIS-mf—8935, pp 521-540) **Quark-gluon plasma: a new state of matter.** McLerran, L.D. (Washington Univ., Seattle (USA). Dept. of Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The theory of high density hadronic matter as described by OCD is reviewed. The prospects for forming a quark-gluon plasma in ultra-relativistic heavy ion collisions are discussed. (author).

32198 (INIS-mf—8935, pp 541-545) **Soliton bag: dynamics and the quark plasma.** Wilets, L.; Goldflam, R.; Achtzehnter, J.; Bickeboeller, M.; Dethier, J.-L.; Henley, E.M.; Luebeck, G.; Rehr, J.; Schuh, A. (Washington Univ., Seattle (USA). Dept. of Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The soliton model of the quark-gluon bag is investigated on three levels of approximation. The normal excitation modes of the quarks and of the soliton fields are determined. Their interactions are calculated assuming small amplitudes. This method leads to the derivation of hadron and hadronic resonance spectra. Finally, large scale deformations, such as bag collisions are studied, employing the generator coordinate method. Some considerations on the equation-of-state of the quark plasma and on the nuclear matter - quark matter phase transition are given.

32199 (INIS-mf—8935, pp 557-564) **Liquid-gas phase transition in nuclear matter.** Siemens, P.J. (Texas A and M Univ., College Station (USA). Cyclotron Inst.; Texas A and M Univ., College Station (USA). Dept. of Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The liquid-gas phase transition of Fermi liquids is investigated. This transition is very important in the structure of neutron stars and in the supernova explosions. The paper shows how laboratory observations using the latest generation of nuclear accelerators can be used to infer the surface tension of the liquid-gas interface in nuclear matter. This property has strong consequences concerning the equation of state of the nuclear matter. Evaluation of fragmentation experimental data leads to reliable parameters of the phase transition.

32200 (INIS-mf—8935, pp 11-16) **Quantum effects in heavy ion collisions process.** Danielewicz, P. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The motion of a nucleon traversing the nuclear medium is investigated based on the non-equilibrium hydrodynamical model of heavy ion collisions. The kinetic parameters (cross section, free path length, free flight time) are estimated using experimental nuclear data. The Boltzmann-like transport equation of the phenomenon is analyzed and quantum effects are taken into consideration by studying equilibration process in nuclear matter, using the non-equilibrium Green's functions and proper self-energies. The equilibration speeds are compared using the classical Boltzmann equation and its quantum modified version. The energy level shifts of the particles and holes in the nuclear matter are determined.

32201 (INIS-mf—8935, pp 43-46) **Subthreshold pion production in nucleus-nucleus collisions - a co-operative process.** Shyam, R.; Knoll, J. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Subthreshold pion production is investigated theoretically in nuclear collision processes where the basic nucleon-nucleon collision can not produce a pion. Possible suggested mechanisms of this process are reviewed and the co-operative character of the phenomenon is emphasized. Predictions of several models are compared with the yields and the shapes of experimental pion spectra. Future importance of microscopic kinematical models is pointed out.

32202 (INIS-mf—8935, pp 47-56) **Subthreshold pion production in nucleus-nucleus collisions.** Jakobsson, B. (Lund Univ. (Sweden)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Experiments on pion production in heavy ion reactions far below the energy per nucleon of the free nucleon-nucleon production threshold can be important sources of information about the collective behaviour of nucleons in nuclei. However, it is first necessary to consider the possibility that pions are produced in single nucleon-nucleon collisions with extra energy supply from the Fermi momenta in the colliding nuclei. Recent data, mainly from the CERN synchrocyclotron are presented, which could form the basis for a discussion about the degree of collectivity involved in the subthreshold pion production mechanism. (author).

32203 (INIS-mf—8935, pp 121-126) **Formation of local moving source and energy deposition in hadron-nucleus reactions.** Nakai, K.; Shibata, T.-A.; En'yo, H. (Tokyo Univ. (Japan). Dept. of Physics) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

In the hadron-nucleus reactions there is a possibility for the formation of a local fireball-like object of high rapidity. This local moving object forms only a part of the target nucleus and, traversing the nuclear medium, it behaves as a source of emitted particles. The experimental study of such local moving sources gives information about the properties of heated and excited hadronic matter. Some results of local moving source experiments (inclusive proton spectra, multiplicities, cross sections) and their interpretation (energy deposition, stopping processes) are summarized. The spatial and temporal structure, size and dynamics of the local moving source are derived.

32204 (INIS-mf—8935, pp 127-132) **Coincidence spectra of backward-forward protons.** Haneishi, Y.; Fujita, T. (Nihon Univ., Tokyo. Dept. of Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The correlated nucleon model is used to investigate the backward proton production problem of heavy ion reactions. The momentum distribution of nucleons is analyzed carefully and the effects of final state interactions are taken into consideration. The model presented is consistent with the single particle spectra as well as with the coincidence spectra and confirms the high momentum component in Fermi motion which seems to be a global property of nuclei from alpha particles to Ta nuclei.

32205 (INIS-mf—8935, pp 133-139) **Neutron induced inclusive light fragment production at intermediate energies.** Franz, J.; Roessle, E. (Freiburg Univ. (Germany, F.R.). Fakultaet fuer Physik); Eroe, J. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics) (and others). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The backward proton problem is investigated in inclusive spectra of charged particles emitted from nuclei. The comparison of reactions induced by protons and by neutrons provides a sensible test for different suggested mechanisms explaining the experimental spectra. The results of the experiments performed at the pulsed neutron beam of SIN of continuous energy spectra with a dominant peak around 540 MeV are reported and compared with the results of similar experiments using proton projectiles.

32206 (INIS-mf—8935, pp 165-172) **Deep inelastic nuclear reactions and their features.** Leksin, G.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The characteristic features of deep inelastic nuclear reactions are summarized. The dependence of cross sections on target mass number is strictly different for the usual reactions taking place in the periphery of nucleus and for the deep inelastic reactions proceeding not on the individual nucleons but deeply within the nuclear volume. Angular and energy dependences, symmetry and scaling properties, isotopic effects and some other features of deep inelastic nuclear reactions are reviewed. The possible important role of quark degrees of freedom in deep inelastic reactions is emphasized.

32207 (INIS-mf—8935, pp 209-216) **Light ion emission from heavy ion induced reactions.** Machner, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The mechanism of heavy-ion-induced nuclear reactions is investigated. The exciton model, successfully applied for the description of light-ion-induced reactions is used to heavy-ion-induced processes. Conjectures concerning energy dependence and symmetry properties of the exciton model parameters are checked comparing the measured spectra of emitted light ions with the predictions of the model. (D.Gy.).

32208 (INIS-mf—8935, pp 287-292) **Aspects of data on the breakup of highly excited nuclei.** Gutbrod, H.H. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)); Warwick, A.I. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The mechanisms by which nuclear fragments of mass number 4-150 are produced in heavy-ion collisions are reviewed. The available experimental data are summarized and some trends showed by them are emphasized which can be used to validate theoretical models. The evaporation model and its generalizations to higher excitations where the nuclear liquid is transformed to nuclear gas are described. Connections with possible phase transitions in infinite nuclear matter are analyzed. The fireball model and its results are described.

32209 (INIS-mf—8935, pp 311-316) **Multifragmentation of big nuclei.** Gross, D.H.E. (Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Kern- und Strahlenphysik; Freie Univ. Berlin (Germany, F.R.). Fachbereich Physik). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Heavy target nuclei split into many fragments when bombarded by protons or heavy ions at very high energies (Esub(p)>10 GeV). A statistical model is presented, which calculates the relative phase-space available for the various multifragment decay channels. It is shown that the Coulomb-interaction between the fragments is crucial. Over the whole fragment-mass region the experimental mass-yield distributions for limiting fragmentation can be reproduced. Further investigations and refinements of the model are needed before a final judgement about the importance of the multifragment phase-space relative to dynamical effects is possible. (author).

32210 (INIS-mf—8935, pp 323-327) **To probe the presence of anomalons by studying characteristics of projectile fragments in heavy ion reactions.** Otterlund, I. (Lund Univ. (Sweden). Dept. of Cosmic and Subatomic Physics); Sherif, M.M. (Cairo Univ. (Egypt). Dept. of Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The plot of the mean free path vs the distance from the origin for each generation will give a definite answer to test the presence of anomalons nuclei without precise determination for the charge distribution of the secondary fragments. This representation is weakly dependent on the efficiency of the scanner and the sensitivity of the emulsion. (author).

32211 (INIS-mf—8935, pp 329-351) **Experimental review of high-energy nucleus-nucleus collisions.** Nagamiya, S. (Tokyo Univ. (Japan). Dept. of Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The single-particle inclusive spectra as well as small-angle two-particle correlations, for light particles emitted at large angles, are reviewed. The author's recent data on backward-forward two-particle correlations in proton-nucleus collisions are discussed, in connection with current efforts on high-psub(T) particle detection in nucleus-nucleus collisions. Also the physics of projectile fragments is described. (author).

32212 (INIS-mf—8935, pp 353-361) **Scaling properties of heavy ion reactions in the hydrodynamical model.** Csernai, L.P. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics); Balazs, N. (State Univ. of New York, Stony Brook (USA)); Dietrich, K.; Schuermann, B. (Technische Univ. Muenchen, Garching (Germany, F.R.). Fachbereich Physik). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The applicability of similarity conditions of the classical non-relativisitic hydrodynamics to the hydrodynamic description of heavy ion reactions is investigated. The similarity parameters of ideal and viscous hydrodynamic equations are defined. The universal functions determining the cross sections depend only on the Strouhal and Reynolds numbers. The method proposed is applicable to comparison of experimental data measured at different masses and energies. Some examples are analysed.

32213 (INIS-mf—8935, pp 363-366) **Non-compensated heat in heavy-ion collisions.** Csernai, L.P.; Lukacs, B. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The thermodynamics of heavy ion reactions is theoretically investigated. A possible source of entropy production is the hypothetic phase transition (probably transition from the nuclear matter to the quark matter state) occuring in the dense, compressed overlap region of colliding nuclei. Thermodynamical considerations show that only non-equilibrium phase transitions cause entropy production. A simple model concerning the kinetics of the phase transition led to a reliable amount of entropy production.

32214 (INIS-mf—8935, pp 409-422) **Dynamics of relativistic nuclear collisions.** Gudima, K.K.; Toneev, V.D. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

On the basis of a microscopic cascade model, the dynamical behaviour of some macroscopic quantities is considered and recent experimental data on the search for collective effects in high-energy heavy-ion collisions are analysed. (author).

32215 (INIS-mf—8935, pp 423-431) **Strange particle production in the heavy-ion collision and the chemical equilibrium.** Gudima, K.K.; Toneev, V.D. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Relative particle yield in the high-energy heavy-ion collisions is described in the framework of the firestreak model by assuming chemical equilibrium. The agreement between theory and experiment is essentially improved allowing for the associated production of strange particles. The model predictions for the strange particle production are in a reasonable agreement with the recent experimental results from Dubna and Berkeley. (author).

32216 (INIS-mf—8935, pp 439-450) **Relativistic heavy ion cascade model.** Remler, E.A. (College of William and Mary, Williamsburg, VA (USA)). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The cascade models of heavy ion reactions can be calculated by computers but their generalization to the relativistic region is difficult and not unique. A new method for defining a Lorentz invariant cascade model is proposed. The model is based on an oversimplified field theory of interactions between scalar nucleons and pions. The field theory defines the general frame of the cascade model with all covariance properties required. Free parameters included in the field theoretical model are to be fitted at the final form of the cascade model to the observed elementary two-particle reaction data.

32217 (INIS-mf—8935, pp 451-461) **Exclusive observables from a statistical simulation of energetic nuclear collisions.** Fai, G. (Lorand Eoetvoes Univ., Budapest (Hungary). Inst. for Theoretical Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Exclusive observables are calculated in the framework of a statistical model for medium-energy nuclear collisions. The collision system is divided into a few (participant/spectator) sources, that are assumed to disassemble independently. Sufficiently excited sources

explode into pions, nucleons, and composite, possibly particle unstable, nuclei. The different final states compete according to their microcanonical weight. Less excited sources, and the unstable explosion products, deexcite via light-particle evaporation. The model has been implemented as a Monte Carlo computer code that is sufficiently efficient to permit generation of large event samples. Some illustrative applications are discussed. (author).

32218 (INIS-mf—8935, pp 463-468) **Calculations of meson production for relativistic heavy ion reactions using hadrochemical and cascade models.** Barz, H.W.; Iwe, H. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)); Biro, T.S.; Lukacs, B.; Zimanyi, J. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The production rates of mesons produced in heavy ion reactions are calculated based on two concurrent theories of nuclear processes occuring during the collision. The hadrochemical model assumes the thermal and chemical equilibrium in the hot, dense core of the compound nucleus or fireball, and explains the production rates via equilibrium processes and hydrodynamical expansion. The cascade model does not assume chemical equilibrium and uses individual collision processes. Predictions of two models concerning pion and kaon production rates are derived and compared with each other and with the experimental data.

32219 (INIS-mf—8935, pp 469-474) **Aspects of light fragment emission in high-energy nucleus-nucleus collisions.** Schuermann, B. (Technische Univ. Muenchen, Garching (Germany, F.R.). Fachbereich Physik). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The model of transport theory is extended to the inclusion of the formation of composite particles and pions through the final state interactions of the nucleons and delta-resonances in the expansion phase of the hot participant zone. Certain aspects of the obtained inclusive spectra are discussed. (author).

32220 (INIS-mf—8935, pp 481-488) **Production of pions in relativistic nucleus-nucleus collisions.** Malfliet, R. (Rijksuniversiteit Groningen (Netherlands). Kernfysisch Versneller Inst.). Aug 1983. NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780275. (CONF-830674—).

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

The pion production rate is investigated theoretically and experimentally in relativistic heavy ion reactions. The two stage model of reaction, including the formation of a hot non-equilibrium region of hadrons and an expansion and breakup stage is analysed. The high cross section and hence the strong absorption of pions are taken into consideration. The possible sources and the multiplicity of pions are investigated. Experimental results are presented concerning the relations of multiplicity and energy, momentum and targent mass or nucleon number.

32221 (INIS-SU—198, pp 424) **Accounting for the contribution of a compound reaction in the presence of channel coupling.** Ezhov, S.N.; Plyu ko, V.A. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32222 (INIS-SU—198, pp 407) **Angular correlations in the evaporation processes.** Vydrug-Vlasenko, S.M.; Zavarzin, V.F.; Kun, S.Yu.; Aleshin, V.P. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32223 (JINR—E-1-83-84) **Application of the Moliere multiple scattering angle-lateral displacement function in Monte-Carlo calculations.** Todorova, G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1983. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701820.

A two-dimensional approximation is found for the multiple scattering angle-lateral displacement correlation formula. The formula satisfies two conditions: it is close to the Moliere one (better than 10^{-2}) and suitable for Monte-Carlo calculations. These Monte-Carlo calculations are made for relativistic particles.

32224 (JINR—R-3-83-532) **Psub(1/2) and psub(3/2) components of the neutron strength function.** Samosvat, G.S. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1983. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701821.

A brief review is presented which demonstrates that it is impossible to observe spin-orbital splitting of 3p-maximum of the neutron strength function without the resonance separation over spins. The sterngth functions for p-resonances with different spins $S^1(J)$ are expressed through the strength functions Ssub(1/2)sup(1) and Ssub(3/2)sup(1) for psub(1/2) and psub(3/2) neutrons. The values of Ssub(1/2)sup(1) and Ssub(3/2)sup(1) are obtained from the available experimental data, which are not yet sufficient for a definite conclusion about splitting.

32225 (JINR—R-4-83-110) **Some applications of the evolution method in a coupling constant in nuclear physics.** Khankhasaev, M.Kh. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1983. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701822.

The review presents a special method for the description of a quantum system based on the law of system evolution in the coupling constant (CCE-method). In a few-body problem this method leads to simple analytical expressions for phases of neutron-deuteron scattering, for the triton binding energy, and so on. In the framework of the CCE-method a unitary iteration procedure for the direct calculation of pion-nucleus scattering is developed. The description of the scattering and of bound states of two particles (either elementary or compound) whose interaction consists of short- and long-range components is given.

32226 (JINR—R-4-83-411) **Soliton type solutions in nuclear hydrodynamics.** Kartavenko, V.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1983. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701823.

Soliton type solutions in nuclear hydrodynamics are investigated. It is shown that equations of nuclear hydrodynamics with the Skyrme forces can be reduced in the quasiclassical limit to the nonlinear Schroedinger equations which can be used for analysing statical and dynamical phenomena of heavy ion reactions. The main features of one-dimensional and spherical symmetirc soliton solutions are analysed, and are shown to describe well the properties of a nuclear density in the ground state. The stability of the soliton solutions is briefly investigated. It is pointed that spherical symmetric nodal isomer states of a nuclear density may exit.

32227 (LA-UR—84-1566) **Dynamics of fission and heavy ion reactions.** Nix, J.R.; Sierk, A.J. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 16p. (CONF-8405179—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012441.

From International conference on theoretical approaches to heavy ion reaction mechanisms; Paris, France (14 May 1984).

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Recent advances in a unified macroscopic-microscopic description of large-amplitude collective nuclear motion such as occurs in fission and heavy ion reactions are discussed. With the goal of finding observable quantities that depend upon the magnitude and mechanism of nuclear dissipation, one-body dissipation and two-body viscosity within the framework of a generalized Fokker-Planck equation for the time dependence of the distribution

function in phase space of collective coordinates and momenta are considered. Proceeding in two separate directions, the generalized Hamilton equations of motion for the first moments of the distribution function with a new shape parametrization and other technical innovations are first solved. This yields the mean translational fission-fragment kinetic energy and mass of a third fragment that sometimes forms between the two end fragments, as well as the energy required for fusion in symmetric heavy-ion reactions and the mass transfer and capture cross section in asymmetric heavy-ion reactions. In a second direction, we specialize to an inverted-oscillator fission barrier and use Kramers' stationary solution to calculate the mean time from the saddle point to scission for a heavy-ion-induced fission reaction for which experimental information is becoming available. 25 references.

32228 **(LA-UR—84-1623) Theoretical aspects of double beta decay.** Haxton, W.C. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 17p. (CONF-8404155—1; CONF-840449—11). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012449.

From 5. workshop on grand unification; Providence, RI, USA (12 Apr 1984).

Considerable effort has been expended recently in theoretical studies of double beta decay. Much of this work has focussed on the constraints this process places on gauge theories of the weak interaction, in general, and on the neutrino mass matrix, in particular. In addition, interesting nuclear structure questions have arisen in studies of double beta decay matrix elements. After briefly reviewing the theory of double beta decay, some of the progress that has been made in these areas is summarized. 25 references.

32229 **(TRI-PP—82-46) Relative energy variable in covariant nuclear wavefunctions.** Keister, B.D. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701824.

The roles of the relative time variable and its conjugate, the relative energy, are examined in three model bound states of two scalar nucleons, corresponding to different binding energies and different masses of exchanged scalar mesons. Solutions to the ladder Bethe-Salpeter equation are compared to those of three-dimensional equations in which the relative energy variable is fixed by the form of reduction. These three-dimensional solutions are also used to approximate four-dimensional functions which are compared to the Bethe-Saipeter solutions in the region of the first meson production threshold.

32230 **(UCRL—90807) Basic and heavy ion scattering in time dependent Hartree-Fock Theory.** Weiss, M.S. (Lawrence Livermore National Lab., CA (USA)). 17 May 1984. Contract W-7405-ENG-48. 25p. (CONF-8403126—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012318.

From Winter school on fundamental nuclear physics; Trieste, Italy (11 Mar 1984).

Portions are illegible in microfiche products.

Time Dependent Hartree-Fock theory, TDHF, is the most sophisticated, microscopic approach to nuclear dynamics yet practiced. Although it is far from a description of nature it does allow us to examine multiply interactive many-body systems semi quantum mechanically and to visualize otherwise covert processes. Some of the properties of the TDHF equations are stated leaving the interested reader to one of several excellent review articles for the derivations. Some of the applications to the collision of heavy ions are briefly described. (WHK)

32231 **(UNIGRAZ-UTP—08-83) Off-shell effects in nucleon-deuteron polarization observables.** Zankel, H.; Plessas, W. (Graz Univ. (Austria)). 1983. 31p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701773.

A separable representation of the S-wave Paris potential and a phase-shift equivalent Yamaguchi-type potential significantly differing in their off-shell behaviours are used to calculate second-order polarization observables of elastic neutron-deuteron scattering at E/sub D/=10 and 20 MeV. Off-shell effects are found in C/sub y,y/,K/sup/y'/sub/y'/, K/sup x'/sub x'/. They stem from differences in the nuclear interaction in the inner region r < or approximately 1.2 fm. Adding approximate Coulomb-distortion contributions proton-deuteron predictions are obtained. Coulomb effects are not found to be negligible. Comparison with proton-deuteron data tends to prefer the interaction model that contains an intermediate-range repulsion.

32232 **Baryon distribution in relativistic heavy-ion collisions.** Wong, C. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review Letters;* **52**: No. 16, 1393-1396(16 Apr 1984). Contract W-7405-ENG-26.

We estimate the baryon distribution in highly relativistic heavy-ion collisions in order to determine the baryon impurity of the quark-gluon plasma in the central rapidity region. In the energy range of s/sup 1/2//A ~ 30—100 GeV per nucleon, the degree of impurity, which can be improved slightly with increasing bombarding energy, is a few percent in energy density.

32233 **Nuclear (π,p) reaction is consistent with a 2N absorption process.** Girija, V.; Koltun, D.S. (Department of Physics and Astronomy, University of Rochester, Rochester, New York 14627). *Physical Review Letters;* **52**: No. 16, 1397-1400(16 Apr 1984).

We show that the rapidity analysis of (π,p) inclusive data on nuclei measures not only the number of nucleons coherently involved in pion absorption, but also the mean momentum loss due to incoherent multiple scattering. We use a statistical theory to calculate the mean momentum loss, also reproducing the inelastic and absorption cross sections. The (π,p) rapidity data can be reproduced with a 2N absorption mechanism, but not with larger clusters, in contrast to earlier analysis which neglected multiple scattering before absorption.

32234 **Nucleon-nucleon potentials with and without $\Delta(1232)$ degrees of freedom.** Wiringa, R.B.; Smith, R.A.; Ainsworth, T.L. (Physics Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1207-1221(Apr 1984). Contract W-31-109-ENG-38.

We present two new nucleon-nucleon (NN) potentials: a v_{14} model that is a conventional NN potential and a v_{28} model with explicit $\Delta(1232)$ degrees of freedom. The v_{14} model has 14 operator components describing NN channels, while the v_{28} model has 14 additional operators, including 12 transition operators for all possible $\pi N\Delta$ and $\pi\Delta\Delta$ couplings and two central operators for $N\Delta$ and $\Delta\Delta$ channels; the latter are constrained so that the v_{28} model has no additional free parameters for data fitting. The two models give excellent and almost identical fits to deuteron properties and np scattering below 330 MeV. The v_{14} and v_{28} forms are convenient for nuclear structure calculations; when many-body cluster contributions are evaluated the v_{28} model will automatically include much of the effect attributed to many-body forces in conventional models, while the v_{14} model will provide a standard of comparison.

32235 **Momentum-space solution of a bound-state nuclear three-body problem with two charged particles.** Lehman, D.R.; Eskandarian, A.; Gibson, B.F.; Maximon, L.C. (Department of Physics, The George Washington University, Washington, DC 20052). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1450-1460(Apr 1984).

Momentum-space wave function equations are derived for the three-body system of one neutral and two charged particles where the separable interaction is spin and charge independent. The three-body wave function is decomposed so that the equations for the "pure" nuclear components contain the two-nucleon t matrix, as usual, but the equation for the additional Coulomb component is formulated in terms of the Coulomb potential rather than introducing the Coulomb t matrix. The relationship of these equations to the scattering-amplitude equation of Veselova, in which the Coulomb t matrix appears explicitly, as applied to the same problem by Kok et al., is given. After partial-wave decomposition, the wave function equations are solved numerically with partial waves through $l = 4$ retained. The logarithmic singularity that appears when the Coulomb potential is expressed in momentum space is handled for each l by a subtraction technique originated by Lande. Because of the

symmetry of the problem, only even values of l arise throughout and only the l = 0 and l = 2 partial-wave contributions are required to predict the binding energy (and wave-function components) to four significant figures. An order α (fine-structure constant) approximation (i.e., decoupling the Coulomb wave function component from itself) is made to check its validity. It is shown that this $O(\alpha)$ approximation is equivalent to replacing the Coulomb t matrix by the Coulomb potential in the Veselova equations.

32236 **Reply to "Calculation of the Lorentz-weighted average from high-resolution low-energy neutron scattering data".** Johnson, C.H.; Larson, N.M.; Mahaux, C.; Winters, R.R. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1563-1565(Apr 1984).

We substantiate our previous results on the danger of identifying the energy-average scattering function with the Lorentz-weighted average of a scattering function fitted to the experimental data in a finite energy interval.

32237 **Off-shell and nonlocal effects in proton-nucleus elastic scattering.** Picklesimer, A.; Tandy, P.C.; Thaler, R.M.; Wolfe, D.H. (Department of Physics and Astronomy, University of Maryland, College Park, Maryland 20742 and Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] C: Nuclear Physics;* **29**: No. 4, 1582-1585(Apr 1984).

The influence of off-shell and nonlocal effects in the first-order nonrelativistic microscopic optical potential is investigated for elastic proton scattering above 100 MeV. With the free nucleon-nucleon t matrix taken from the model of Love and Franey, these effects are significant only for scattering angles greater than about 60° and energies below about 300 MeV. The inadequacy of the standard first-order theory for predictions of spin observables at forward scattering angles remains unchanged when these effects are included and the need for higher order processes including medium and relativistic effects is reinforced.

32238 **Structure of alternative supersymmetry schemes in nuclei.** Vallieres, M.; Sun, H.Z.; Feng, D.H.; Gilmore, R.; Casten, R.F. (Drexel Univ., Philadelphia, PA). *Physics Letters, [Section] B;* **135**: No. 5/6, 339-343(16 Feb 1984).

The structural differences of two group chain decompositions for a multi-j IBA supersymmetry applicable to nuclei in an O(6) region are discussed in terms of core polarization, and compared to data for ^{197}Pt. It is shown that the wave functions for the lowest two representations are identical in the two chains. This is interpreted in terms of the concept of stretched configurations and leads to suggested experiments to better distinguish the two alternative supersymmetries. Analogous results for an SU(5) region are briefly outlined.

6540 Radiation And Shielding Physics

REFER ALSO TO CITATION(S) 31640, 31641

32239 **(FEI—1289) Heterogeneous effects and influence of an output channel during neutron spectra measurement by the time-of-flight method.** Shapar', A.V.; Dulin, V.A.; Mironovich, Yu.N.; Petrov, V.L.; Noak, K. (Erevanskij Fizicheskij Inst. (USSR)). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701735.

The influence of a heterogeneous structure of a large physical bench assemblies on the results of neutron spectra measurements by the time-of-flight method is considered. Calculation of measuring channel for neutron beam output from the centre of an assembly by the Monte Carlo method is performed. The experience of the time-of-flight method development for neutron spectrometry in fast critical assemblies is described.

32240 **(INIS-mf—8339) Measurement of multi-differential electron distributions of an electron beam in nitrogen.** Leuthold, G. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Elektrotechnik). 1982. 93p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number TI84701915.

Numerical codes for electron transport calculations are very important in the field of microdosimetry and thus in quantitative radiation biology. In this work electron spectra have been measured in the track of 1 KeV electrons travelling in a nitrogen atmosphere for different angles in the energy range 8-1000 eV, using a special measuring apparatus. The comparison of the results with theory (Monte Carlo simulation) is a very suitable tool for the verification of the assumptions and approximations made in numerical electron transport codes.

32241 **(INIS-mf—8344) Examination of the density dependence of the slowing-down cross section of liquid ethane for ^{7}Li-projectiles.** Both, G. (Koeln Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 17 Jul 1982. 65p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number TI84701916.

The density dependence of the slowing-down cross section of ethane molecules in the liquid phase for ^{7}Li-projectiles was measured. The measurement was done at the temperature of ethane at 14°C and -74°C and in the energy range of ^{7}Li-projectiles between 175 and 840 keV.

32242 (INIS-mf—8968, pp 91-97) **New insights into the role of metastable particles in pre-breakdown swarm experiments.** Haydon, S.C. (New England Univ., Armidale (Australia). Dept. of Physics). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Swarm phenomena become very complex in gases containing energetic neutral metastable particles. Preliminary observations have stressed the need for more highly time-resolved studies to separate the electron, positive ion and Penning ionization components in the ionization growth. At the same time it is essential to establish the origin and interpretation of the more complex 1/tau vs $1/d^2$ plots associated with the Molnar analysis and indeed to reassess the validity of the Molnar approach itself. The purpose of the present paper is to outline new techniques that have led to further insights into the parameters controlling metastable particle contributions to swarm phenomena. Both the first ionization coefficient α/N and the spacially dependent secondary coefficient ω-bar(d) are evaluated from observations of the spatial growth of ionization between plane-parallel electrodes at constant E/N (electric field/gas density). A quenching parameter $\mu/\alpha = \alpha^{-1}\sqrt{G/Dsub(m)}$, were G and Dsub(m) are the volume destruction and diffusion coefficient respectively for metastable particles, provides a means for comparing observation of ω-bar(d) with theory. Temporal investigation of the ionization growth lead to values of both G and Dsub(m). The validity of Molnar's analysis was tested and the latter applied to observations in highly pure N_2. A new technique has been developed specifically for investigations of the role of metastable particles in swarm experiments. New ionization effects were observed with highly purified samples, they are explained by a sensitive balance between the production and destruction of two metastable particles of the same gas, themselves capable of interacting with each other to yield new sources of free electrons.

32243 (INIS-SU—198, pp 398) **Computation of stopping powers of protons and alpha particles in multicomponent substances in a wide energy range.** Markova, L.I.; Mashkarov, Y.G. 1983. (In Russian). NTIS (US Sales Only), PC A99/MF A01. Order Number TI84780104. (CONF-8304144—Summ.).

From 23. conference on nuclear spectroscopy and nuclear structure; Moscow, USSR (19 Apr 1983).

32244 (INIS-SU—222, pp 36-41) **Influence of atom-atom collision cascade on the diffusion processes.** Reznikova, N.P. (Tol'yattinskij Politekhnicheskij Inst. (USSR)). 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

The influence of the temperatUre field of atom-atom collision cascade on the evolUtion processes of cluster aggregates is considered. It was estimated that there is a possibility of elimination of dislocation pinning. It occurs when dislocations hy-pass the obstacles by the non-conservative Way on the stage of high temperature cascade "annealing".

32245 (INIS-SU—222, pp 85-86) **Surface γ-rays.** Nasonov, N.N. 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

32246 (INIS-SU—222, pp 87-88) **Bremsstrahlung of small frequencies in medium.** Nasonov, N.N. 1982. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number TI84780272.

In Physics of radiation damage and radiation material science.

32247 (IS-M—467) **Accurate wavelength determination through attenuation dips of strongly reflective crystals.** Staudenmann, J.L.; Chapman, L.D.; Murphy, W.J.; Liedl, G.L. (Ames Lab., IA (USA); Purdue Univ., Lafayette, IN (USA). School of Materials Engineering). 1983. Contract W-7405-ENG-82. 11p. (CONF-830910—13). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012836.

From 3. national conference on synchrotron radiation instrumentation; Upton, NY, USA (12 Sep 1983).

Accurate wavelength determination has been made possible by using the attenuation dips of a strongly reflecting crystal when it is rocked near a Bragg position. This transmission method has the advantage that it does not need any collimation between the sample and the detector and that it is constantly set in the line of sight; this eliminates errors due to detector misalignment. Consequently, it is more accurate than any standard Bragg measurement because only one rotation is required: that of the crystal. Measurements between .36618 A and 1.6782 A show that attenuation and refraction significantly shift the dip positions in pyrolitic graphite (ZYA). It is concluded that, when these effects are accounted for, any wavelength in the range mentioned above can be determined with an error of $\sim 0.1\%$ or smaller.

32248 (KFKI—1983-74) **Neutron radiography applications at the CRIP's WWR-SM research reactor.** Balasko, M.; Cser, L.; Svab, E.; Zsigmond, Gy. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Aug 1983. 20p. (In Hungarian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701717.

Neutron radiographic experimental equipment has been constructed at the WWR-SM 4.6 MW research reactor in the Central Research Institute for Physics (CRIP). Scintillation screen (^{6}LiF+ZnS(Ag)) is used for the neutron-to-light conversion and for the storage of the picture polaroid film or high-sensitivity camera is used. In addition to the observation of the static structures the visualization of dynamical events can also be carried out.

32249 (RL—83-055) **Use of vanadium as a scattering standard for pulsed source neutron spectrometers.** Mayers, J. (Rutherford Appleton Lab., Chilton (UK)). Jun 1983. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701818.

The Gaussian approximation for multiphonon cross-sections has been used in a calculation of the variation of vanadium cross-sections with incident neutron energy. The results show that vanadium behaves as an elastic scatterer to within a few percent on pulsed neutron spectrometers with incident neutron energies up to 1 eV. There is a calculated anisotropy in the scattering of 8%. It is found that the scattering properties of vanadium at 77K and 293K differ by a maximum of 1% except for neutron energies < 15 meV.

32250 (SAND—84-0570) **Recommendations for a production discrete-ordinates coupled electron-photon transport capability.** Morel, J.E.; Nelson, W.E. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 16p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012957.

The purpose of this study was to determine if a production capability for discrete-ordinates coupled electron-photon transport calculations should be developed and, if so, to recommend how it should be done. It is concluded that such a capability should be developed. The purpose of this report is to detail reasons for making these conclusions, and further to make specific recommendations regarding the manner in which this dvelopment should be carried out. The discrete ordinates method is a deterministic method originally developed to solve the neutron transport equation. For this purpose, it has proven to be an accurate and efficient technique. In particular, it has proven to be much more efficient than Monte Carlo methods in one spatial dimension. All current production methods for coupled electron-photon transport calculations are based upon the condensed history method developed by Berger. This method is generally quite expensive for problems of interest to the weapons radiation effects community, even when the problems are limited to one spatial dimension. Thus, routine engineering design calculations involving coupled electron-photon transport must often be performed with rather crude and inaccurate methods due to cost constraints. The existence of this global deficiency is the main motivation for developing a discrete-ordinates coupled electron-photon transport capability. It has the potential of being as accurate as Monte Carlo yet efficient enough to be used in routine engineering design calculations.

32251 (ZfI-Mitt—71, pp 57-66) **Characterization of the radiation field and control of the optimal electron beam accelerator operation for industrial processes.** Heger, A.; Dorschner, H.; Schumann, W.; Pleul, D. (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). Jun 1983. NTIS (US Sales Only), PC A16/MF A01. Order Number TI84780373. (CONF-8209165—Exc.).

From 2. working meeting radioisotope application and radiation processing in industry; Leipzig, German D.R. (28 Sep 1982).

The depth dose distribution of electrons in the energy range of 0.1 to 3.0 MeV was investigated. Correlations were derived allowing the optimization of the irradiation process. The spatial dose distributions give indications of the homogeneity and the useful irradiation field.

32252 **Channeling continuum model derivation by method of averaging.** Burns, T.J.; Ellison, J.A. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Physical Review [Section] B: Condensed Matter;* **29**: No. 5, 2790-2792(1 Mar 1984). Contract AC04-76DP00789.

Derivation of the axial- and planar-channeling continuum models from the perfect-string and perfect-plane model by the Krylov-Bogoliubov method of averaging are discussed. For the first time, error bounds are obtained relating the perfect crystal trajectories to the continuum-model trajectories. Details are presented for the axial case, because this case is easier to treat and the generalization to planes is straightforward.

6550 Medical Physics

REFER ALSO TO CITATION(S) 30927, 31281, 31790

32253 (CONF-840512—9) **Computational method for realistic estimates of the dose to active marrow.** Eckerman, K.F.; Cristy, M. (Oak Ridge National Lab., TN (USA)). 11 May 1984. Contract AC05-84OR21400. 4p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012345.

From 6. congress of the International Radiation Protection Association; Berlin, F.R. Germany (7 May 1984).

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Calculation of absorbed dose to active marrow from photon radiation is a complex problem because electronic equilibrium may not exist in the vicinity of soft tissue-bone mineral interfaces.

Snyder et al. recognized the intractable geometry of trabecular bone in their studies of photon transport in the body and formulated marrow dose estimates in a conservative manner. Other investigators have noted that this approach leads to overestimate by factors of 3 or more at low photon energy. In this paper the absorbed dose is formulated in terms of physical and anatomical parameters defining the energy deposition in the marrow space. 17 references, 2 figures, 1 table.

32254 (INIS-mf—7782, pp 138-148) **Analysis of accuracy of activity measurement for extrapolation coincidence methods.** Zelazny, P. 1979. (In Russian). NTIS (US Sales Only), PC A13/MF A01. Order Number TI83780837. (CONF-7905228—).

From International symposium on methods of production and measurement of standard sources and solutions; Marianske Lazne, Czechoslovakia (15 May 1979).

Grounds have been presented as well as an order of actions in application of the methods of extrapolation of activity values depending on efficiency of counting in the case of absolute measurements of radioactivity concentration by the coincidence methods and application of the metrological labels technick. Influence has been shown of geometry of distribution of measurement points on the accuracy of determination of the value to be extrapolated. Results have been given of investigations of influence of straggling of counting efficiency on the results of extrapolation and on the value of the random error taking into account inclination of extrapolation curve. Methodology has been presented of determination of statistical weight of points which had been used for plotting of the extrapolation curve. Dependence has been deducted of the random error in measurement of emitter's activity and activity of a label in a summary radiation source. This dependence permits to find optimum conditions for measuring of the emitter's activity in different systems of metrological label-emitter.

32255 (INIS-mf—7782, pp 168-170) **Activity of International Committee on metrology of radionuclides.** Radoszewski, T. 1979. (In Russian). NTIS (US Sales Only), PC A13/MF A01. Order Number TI83780837. (CONF-7905228—).

From International symposium on methods of production and measurement of standard sources and solutions; Marianske Lazne, Czechoslovakia (15 May 1979).

Brief information has been given in the paper on the activity of the International Committee on Metrology of Ra dionuclides (ICRM). Main directions of activity of this Committee as well as problems which 5 working groups of the Committee are dealing with have been pointed out. Cooperative works have been listed which had been carried out up to the present time and organized by the Committee. List has been given of members of the Board of managers of this Committee as well as names of managers of Working groups.

32256 (INIS-mf—8736) **Irradiation planning and dosimetry with πp mesons.** Hoffmann, W. (Wuppertal Univ. (Gesamthochschule) (Germany, F.R.). Fachbereich 8 - Naturwissenschaften 1 - Physik). Nov 1980. 141p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE84780283.

An analytical program for irradiation planning is presented for the 60-beam π-applicator (Piotron). Using this program, the three-dimensional dose distribution can be calculated for an arbitrary orientation of the patient and arbitrary applicator parameters. To study the influence of inhomogenieties of the human body, the stopping power for π^--mesons has been measured for relevant materials. As a result, the stopping power of heavy particles can be described with a high precision by the Bethe-Bloch equation using an appropriate average of the ionisation potentials. Thus also the range variations due to inhomogenieties can be taken into account by an analytical program. To verify the calculated dose distributions, an experimental method has been developed to measure the three-dimensional π^--dose distributions simultaneously, using CaF_2:Tm thermoluminescence dosemeters. From the analysis of the glow curve the total dose can be determined as well as the mean LET-value, so that the distribution of the biological efficiency can be predicted. A special treatment of the TL-materials opens new possibilities for the application in "in vivo" dosimetry, for the dosimetry of other heavy charged particles and for neutrondosimetry. (orig./HP).

32257 **Beta- and gamma-dose measurements of the Godiva IV Critical Assembly.** Hankins, D.E. (Lawrence Livermore National Lab., CA). *Health Physics;* **46**: No. 3, 561-579(Mar 1984). Contract W-7405-ENG-48.

To aid in the re-evaluation of an exposure that occurred in 1963, information was required on the response of film badges to the beta- and gamma-ray doses from a critical assembly. Of particular interest was the beta spectra from the assembly. The dose rates from the Los Alamos National Laboratory Godiva IV Critical Assembly were measured at numerous distances from the assembly four and 12 days following a burst. Information was obtained on the beta-particle spectra using absorption curve studies. The beta/gamma dose-rate ratio as a function of distance from the assembly was determined. Shielding provided by various metals, gloves and clothing was measured. The beta- and gamma-ray dose measured were copmpared with a film packet used in the past at the Nevada Test Site with two types of current TLD personnel badges. Measurements made with a commercial thin-window ion chamber instrument are compared with the dose rates obtained using other dosimeters.

32258 **Energy absorption in cylinders containing an off-axis linear source.** Salib, S.K.; Anderson, V.E.; Rustgi, A.K. (Eastman Kodak Co., Rochester, NY). *Health Physics;* **46**: No. 3, 581-585(Mar 1984). Contract W-7405-ENG-26.

An analytical model for evaluating the absorption of gamma rays by cylindrical tissue has been developed. This model introduces the case of an off-axis linear source of radiation inside the cylinder. The total energy absorbed by the tissue for different source strength, absorption properties of the tissues, and the aspect ratio of the length of the cylinder to its radius have been evaluated.

6560 Solid State Physics

REFER ALSO TO CITATION(S) 31961, 32244, 32252, 32284

32259 (INIS-mf—8921, pp 35) **Anomalous magnetic correlations near the percolation threshold.** Gefen, Y.; Kantor, Y.; Aharony, A. (Tel Aviv Univ. (Israel). Dept. of Physics and Astronomy). 1983. NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780235. (CONF-8303128—Summ.).

From Israel Physical Society annual meeting; Ramat-Gan, Israel (24 Mar 1983).

32260 **Critical properties of the void percolation problem for spheres.** Elam, W.T.; Kerstein, A.R.; Rehr, J.J. (Naval Research Laboratory, Washington, DC 20375). *Physical Review Letters;* **52**: No. 17, 1516-1519(23 Apr 1984).

The method outlined by Kerstein has been used to simulate percolation of the void region between overlapping, randomly located spheres. The computed threshold is in agreement with the previous result of Kertesz. In addition, three critical exponents are computed and are found to be in agreement with the universality hypothesis. This constitutes the first such evaluation for a three-dimensional nonlattice problem and the first test of universality for a percolation problem with no underlying network defined a priori.

32261 **Shear viscosity of the hard-sphere fluid via nonequilibrium molecular dynamics.** Erpenbeck, J.J. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review Letters;* **52**: No. 15, 1333-1335(9 Apr 1984).

The shear viscosity eta of the hard-sphere fluid, at volumes of 1.6 and 2 times the closed-packed volume, is computed with use of nonequilibrium molecular dynamics. At high shear rate epsilon-dot we observe a phase transition in which the system undergoes two-dimensional ordering in the plane perpendicular to the flow, accompanied by a sharp decrease in eta. For small epsilon-dot, no evidence is found for the square-root dependence on epsilon-dot reported by previous investigators.

32262 **Linear augmented-Slater-type-orbital method for electronic-structure calculations.** Davenport, J.W. (Department of Physics, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *B: Condensed Matter;* **29**: No. 6, 2896-2904(15 Mar 1984). Contract AC02-76CH00016.

The purpose of this paper is to explore the possibility of using augmented Slater-type orbitals (STO) as basis functions for electronic-structure calculations. STO's have a radial dependence given by r/sup n/-1exp(-zetar) and as a result have a number of important advantages. They are localized about sites and have the same asymptotic form as actual atomic orbitals. They are regular at the origin and possess analytic Fourier transforms. The Fourier transform can be manipulated to yield an addition theorem, that is, a reexpansion formula for an STO about another site which is similar to the one used for spherical Bessel functions. Augmenting the STO's with numerical solutions of the Schroedinger equation within touching spheres leads to a small secular matrix since the numerical functions are orthogonal to all the core states and the STO's are only used in the interstitial region. The method has been applied to copper, silver, and palladium using Chodorow-type potentials and accounting for all relativistic effects except spin-orbit coupling. The results on copper are in good agreement with previous calculations and with experiments. The results on Pd and Ag are in better agreement with photoemission experiments than fully self-consistent local-density calculations.

32263 **Self-consistent approximation for muffin-tin models of random substitutional alloys with environmental disorder.** Kaplan, T.; Gray, L.J. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review* [*Section*] *B: Condensed Matter;* **29**: No. 6, 3684-3686(15 Mar 1984). Contract W-7405-ENG-26.

The self-consistent approximation of Kaplan, Leath, Gray, and Diehl is applied to models for substitutional random alloys with muffin-tin potentials. The particular advantage of this approximation is that, in addition to including cluster scattering, the muffin-tin potentials in the alloy can depend on the occupation of the surrounding sites (i.e., environmental disorder is included).

32264 **Structure factor of a correlated nonuniform fermion gas at small wavelength.** Rasolt, M. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830 and Department of Physics, Harvard University, Cambridge, Massachusetts 02138). *Physical Review* [*Section*] *B: Condensed Matter;* **29**: No. 6, 3703-3704(15 Mar 1984). Contract W-7405-ENG-26.

The structure factor of a nonuniform interacting electron gas is examined at large wave vectors to delineate the difference between lowest- and higher-order perturbation contributions. Implications for the exchange-correlation energy are also discussed.

6561 Superconductivity

REFER ALSO TO CITATION(S) 31171, 31204, 31208, 31268, 31271

6570 Theoretical Physics

REFER ALSO TO CITATION(S) 32423

32265 **(BARC—1194) Linear steady heat transfer analysis by boundary element method.** Kushwaha, H.S.; Kakodkar, A. (Bhabha Atomic Research Centre, Bombay (India)). 1983. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701718.

The boundary element method for linear steady heat transfer analysis has been developed. Two types of elements, namely, constant elements and linear elements are described. A mention has been made of the analysis of the problems of a square plate subjected to two constant temperature boundaries and other two being insulated, blunt fin with convection boundary condition, and the steady state temperature distribution in circular segment by using this method.

32266 **(CTOM—46979) Kinematics in special and general relativity.** Woodside, R.W.M. (McMaster Univ., Hamilton, Ontario (Canada)). May 1979. 103p. Canadian Theses on Microfiche Service, National Library of Canada, Ottawa, Canada, K1A 0N4. Order Number TI84701936.

This thesis investigates the problem of motion for extended bodies from the viewpoint of classical field theory, where the classical field is the body's energy-momentum or matter tensor. In special relativity a symmetric and divergence-free matter tensor combined with inertial frames is used to generate a kinematics for extended bodies. In general relativity the author suggests an analogous kinematics and applies it to the simplest non-trivial example of static, spherical stars, looking for special sets of vector fields whose matter currents are conserved. Such a set of ten vector fields defines a special frame, and integrals of the conserved matter currents define ten momenta whcih give the kinematics. Application of de Rham cohomology theory shows that the conserved matter currents for isolated bodies will have mechanical potentials which enable the momenta to be found from flux integrals evaluated in the vacuum region surrounding the body. These potentials contain the full Riemann curvature, allowing a body's general relativistic momenta to be determined by its vacuum graviational field.

32267 **(CTOM—48361) Functorial semantics for quantum logic. Towards a realist interpretation of logical structure in quantum mechanics.** Holdsworth, D.G. (University of Western Ontario, London (Canada)). Sep 1979. 429p. Canadian Theses on Microfiche Service, National Library of Canada, Ottawa, K1A 0N4. Order Number TI84701933.

The author uses category theory to examine a quantum logical interpretation of quantum theory. The central thesis is that logical structure is an objective feature of reality, not merely a feature of representation of reality inherent in particular theories. A nonclassical foundation for mathematics is adopted, one that uses morphisms as its primitives. The author argues that all propositions in a physical theory are theoretical and that observation statements constitute a subclass of theoretical statements. Inferences to micro- and macro-objects are on the same pragmatic and logical level, and defending realism for quantum theory involves providing a new criterion of objectivity that coheres with the general constraints of the theory. The criterion proposed has the consequence that certain structural features of reality are to be considered theoretically determined or objective. These features are closely related to logical structure.

32268 (INIS-BR—107, pp 64-65) **Generalized treatment of point canonical transformation in the path integral.** Girotti, H.O.; Simoes, T.J.M. (Rio Grande do Sul Univ., Porto Alegre (Brazil). Inst. de Fisica). 1983. NTIS (US Sales Only), PC A10/MF A01. Order Number TI84780267.

In Progress Report 1981-1982 - Instituto de Fisica - Universidade Federal do Rio Grande do Sul.

32269 (INIS-mf—8365, pp 66) **Boson expansion based on the extended commutator method in the Tamm-Dancoff representation.** Tamura, T.; Pedrocchi, V.G. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32270 (INIS-mf—8365, pp 73) **Configuration of minimum energy for a deformed oscillator.** Hilton, R.R.; Mang, H.J. 1982. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32271 (INIS-mf—8365, pp 80) **Bell's inequality and the uncertainty principle.** Hartmann, K.M. 1982. NTIS (US Sales Only), PC A09/MF A01. Order Number TI84780230.

In Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen.

32272 (INIS-mf—8759) Time decay for the solutions of some nonlinear Schroedinger equations. Dias, J.P. (Bielefeld Univ. (Germany, F.R.). Zentrum fuer Interdisziplinaere Forschung). 1984. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84702053.

The author presents some results concerning the time decay of the solutions of a nonlinear Schroedinger equation.

32273 (INIS-mf—8760) Some remarks on the asymptotic behaviour of solutions to nonlinear Schroedinger equations. Cazenave, T. (Bielefeld Univ. (Germany, F.R.). Zentrum fuer Interdisziplinaere Forschung). [nd]. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84702054.

We present here some methods to study the stability of standing waves, that is of solutions of the form phi (t,x) = exp (ilambdat)u(x).

32274 (INIS-mf—8951) Scattering theory for explicitely time-dependent interactions. Perusch, M. (Graz Univ. (Austria)). 1982. 66p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701934.

Multiple ionization of hydrogen atoms has got increased attention in recent years in connection with high-power lasers. Due to the strong external electromagnetic fields, perturbation theory is no longer valid. The expression for the multiple ionization probability contains the projections of the time-dependent Hamilton operators and the Moeller operators. The main point of the present work is a proof of existence and completeness of the Moeller operators. The proof of existence and completeness is given. The final chapter contains a physical interpretation and discussion of the multiple ionization probability.

32275 (INIS-mf—8954) Quantum theory of anharmonic oscillators. Some exact relations between matrix elements and their use for various approximation methods. Yamazaki, K. (Technische Univ., Graz (Austria). Inst. fuer Theoretische Physik und Reaktorphysik; Kyoto Univ. (Japan). Dept. of Physics). (Technische Univ., Graz (Austria)). 1983. 39p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701935.

This is an investigation of an anharmonic oscillator characterized by the potential ωsub(o)²/2 g² + lambda'q⁴. By using the equations of motion and the relations obtained by evaluating <i'[H,O]+'j> where O is an arbitrary operator, H is our total Hamiltonian and 'i> and 'j> are exact eigenstates of H, we derive an exact recurrence formula. This formula allows us to express tau-functions with a higher power of the variables through tau-functions with a lower power of the variables and energy eigenvalues. In this way we derive several exact relations, which are, in a sense, generalizations of the virial theorem and sum rules. These exact relations are the central equations of this paper. On the basis of these exact relations we propose our 'nearest neighbour level' (N.N.L.) approximation, which seems to provide a good approximation scheme. We can also use our exact relations to test the validity of various approximation methods, and as an example, we discuss the 'New-Tamm-Dancoff' (N.T.D)-type of approximation in detail.

32276 (INIS-mf—8955) Quantum theory of anharmonic oscillators. A variational and systematic general approximation method. Yamazaki, K. (Technische Univ., Graz (Austria)). 1983. 53p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701755.

This is an investigation of the energy levels and wave functions of an anharmonic oscillator characterized by the potential ω²/2 q² + lambda q⁴. As a lowest order approximation an extremely simple formula for energy levels: Esub(i)sup((O)) = (+1/2)1/4(3/αsub(i)+αsub(i)) is derived (i being the quantum number of the energy level), which covers any (lambda,i). αsub(i) is the real positive root of a cubic equation: ysub(i)αsub(i)³+αsub(i)²-1 = O, with ysub(i) = 6lambda(2i²+2i+1)/(2i+1). This formula reproduces the exact energy levels within an error of about 1 % for any (lambda,i) (The worst case is 2 % for i=0, lambda -> infinity). Systematically higher orders of 'our' perturbation theory are developed, which contains the 'usual' perturbation theory for the limiting case of small lambda, but 'our' perturbation theory is valid for any (i,lambda). 'Our' second order perturbation theory reduces the errors of our lowest order results by a factor of about 1/5 in general. Various ranges (large, intermediate, small) of (i, lambda) are investigated and compared with the exact values obtained by the Montroll group. For the case of i=0,1, even 'our' forth order perturbation calculation can be elaborated explicitly, which reduces the error to about 0.01 % for any lambda. For small lambda it gives correct numerical coefficients up to lambda⁴ terms, as it should be.

32277 (INIS-mf—8968, pp 55-60) Diffusion tensor in electron swarm transport. Makabe, T.; Mori, T. (Keio Univ., Yokohama (Japan). Faculty of Science and Technology). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Expression for the diffusion tensor of the electron (or light ion) swarm is presented from the higher-order expansion of the velocity distribution in the Boltzmann equation in hydrodynamic stage. Derived diffusion coefficients for the transverse and longitudinal directions include the additional terms representative of the curvature effect under the action of an electric field with the usual two-term expressions. Numerical analysis is given for the electron swarm in model gases having the momentum transfer cross section Qsub(m)(epsilon)=Q₀epsilon sup(beta) (β=0, 1/2, 1) using the present theory. As the result, appreciable degree of discrepancy appears between the transverse diffusion coefficient defined here and the conventional expression with increasing of β in Qsub(m).

32278 (INIS-mf—8968, pp 61-65) Lateral diffusion coefficient and velocity distribution function of electrons under electric field. Ikuta, N. (Tokushima Univ. (Japan). Technical Coll.). 1983. NTIS (US Sales Only), PC A12/MF A01. Order Number TI84780269. (CONF-8308112—).

From 3. international Swarm seminar; Innsbruck, Austria (3 Aug 1983).

Precise Monte-Carlo simulation (MCS) of electron motion has shown that the diffusion coefficient Dsub(v) defined in velocity space does not give exact values of the lateral diffusion coefficient Dsub(T). The cause of the disagreement is considered to be the change of electron energy during free flights, the curving of electron trajectories under the influence of applied electric field. The difference between Dsub(v) and Dsub(T) appears large in cases of the collision frequency largely dependent on electron energy and of large energy loss at the collision. The diffusion coefficient Dsub(v) under zero field and of no energy-loss at the collision agrees accurately with the lateral diffusion coefficient Dsub(T). (Authors).

32279 (JINR—R-5-83-398) Differential identities and topological invariants in the Riemann, Riemann-Cartan geometries and in the spaces of the arbitrary affine connection. Barbashev, B.M.; Leonovich, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1983. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701753.

The differential identities in the Riemann, Riemann-Cartan geometries and in the spaces of the arbitrary affine connection are obtained, the gravitation Lagrangians being under consideration with the arbitrary dependence on the curvature tensor. The topological Chern, Pontryagin and the Euler-Poincare's invariants in the spaces of any even dimension are considered.

32280 (LBL—17715) Chemical reaction as a quantum transition. Kresin, V.Z.; Lester, W.A. Jr.; Dupuis, M.; Dateo, C.E. (Lawrence Berkeley Lab., CA (USA)). Mar 1984. Contract AC03-76SF00098. 23p. (CONF-8403124—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84011804.

From Sanibel symposia; Palm Coast, FL, USA (1 Mar 1984). Portions are illegible in microfiche products.

In this theory a chemical reaction is treated as a quantum transition from reactants to products. It leads to a Franck-Condon-like factor for the evaluation of product energy distributions. Second quantization representation is used to enable a Hamiltonian for reaction to be defined. A specific adiabatic method is used to

describe the dynamics of nuclear motion. The theory is applied to the reactions: HO + D → OD + H and ClI + D → Cl + ID. Polyatomic photodissociation (cyanogen) can also be treated by a similar formalism.

32281 **(TRI-PP—82-45) Multiple scattering in closely packed systems of arbitrary non-overlapping shapes.** Keister, B.D. (TRIUMF, Vancouver, British Columbia (Canada)). Nov 1982. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701754.

It has long been known that the multiple scattering of waves from a system of obstacles of finite extent can be described completely with a knowledge of the on-shell amplitudes of the individual scatterers, provided that the minimally enclosing spheres concentric with the scattering centers do not overlap. In this paper, it is shown that on-shell amplitudes alone suffice for a wider class of scattering configurations, in which the individual scatterers do not overlap, but their geometries do not satisfy the above condition. These extended geometries require a careful treatment of certain partial wave sums. An example is also discussed in which a pair of non-overlapping scatterers requires more than the on-shell amplitudes for a solution.

32282 **(TRI-PP—82-54) Generating function for a class of effective Chew-Mandelstam functions.** Reid, J.H.; Trofimenkoff, N.N. (TRIUMF, Vancouver, British Columbia (Canada)). Dec 1982. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701756.

We have obtained the generating function for a class of effective Chew-Mandelstam functions for arbitrary integral angular momentum. From this a closed formula for the Chew-Mandelstam functions themselves is derived in both the simple equal mass case and in the more complicated case of unequal masses.

32283 **(TRI-PP—83-4) Unitary transformations, Weyl's association and the role of canonical transformations.** Balazs, N.L.; Jennings, B.K. (TRIUMF, Vancouver, British Columbia (Canada)). Feb 1983. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701757.

Quantum mechanical operators can be associated with functions of p,q through the Weyl or Wigner transform. In this paper we develop alternative associations through the use of unitary transformations, and study the relation between unitary transformations and canonical transformations of the p,q labels.

32284 **(UCRL—90789) Gauge argument for accurate quantization of the Hall conductance.** Laughlin, R.B. (Lawrence Livermore National Lab., CA (USA)). 9 May 1984. Contract W-7405-ENG-48. 9p. (CONF-840284—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012611.

From 3. international winterschool on new developments in solid state physics; Salzubrg, Austria (26 Feb 1984).

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A theory of the Ordinary Quantum Hall Effect which identifies the quantum measured in these experiments as the electron charge is reviewed. This concept is important for understanding why the effect is so accurate, and also for understanding why fractionally charged quasiparticles need be invoked to explain the Fractional Quantum Hall Effect. The vehicle for making this identification is a thought experiment which is described in detail. Von Klitzing's original data are reproduced. A current I is forced to flow between the source and drain of a MOSFET subjected to a magnetic field of strength H /sub O/ normal to its surface. Both the voltage drop in the direction of current flow and the Hall voltage observed at low temperature are plotted against Fermi level (gate voltage). Over a range of Fermi levels one sees the voltage drop in the direction of current flow going to zero and the Hall voltage plateauing to a constant current flow going to zero and the Hall voltage plateauing to a constant value. Von Klitzing originally reported that this value obeyed the equation I/V/sub H/ = n e^2/h to one part in a million. More recent measurements by the US Bureau of Standards in collaboration with Bell Laboratories have decreased the error to 10^{-7}. Thus the facts we wish to explain are the following: (1) the system exhibits a zero resistance state; (2) it does this over a range of carrier densities; (3) the Hall conductance is constant over this range; and (4) the constant value of the Hall conductance obeys von Klitzing's equation. The elementary quantum mechanics of this system is described, and the explanation of the effect in terms of quantization of the charge density is given. (WHK)

32285 **(UFRJ-IF—12/82) Bianchi type-I models with conformally invariant scalar field.** Accioly, A.J.; Vaidya, A.N.; Som, M.M. (Rio de Janeiro Univ. (Brazil). Inst. de Fisica). 1982. 11p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701764.

The solutions of the Einstein equations with the trace-free energy-momentum tensor of conformally invariant scalar field as source are obtained in a spatially homogeneous anisotropic spacetime. Some interesting features of the solutions are discussed.

32286 **(UNIGRAZ-UTP—10-83) Simple approximation for eigenvalues in quantum theory.** Mitter, H.; Yamazaki, K. (Graz Univ. (Austria)). 1983. 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701759.

An approximation method for the determination of energy levels in quantum theory is discussed, which starts from a scaled set of eigenstates of a solvable model. It is shown, that the lowest approximation fulfills certain relations, which hold also exactly. The approximation is tested by comparison with numerically computed eigenvalues in several cases. The errors turn out to be moderate in most of these and depend very little on typical coupling constants.

32287 **(UWThPh—80-03) Identification of trivial solutions in supergravity.** Aichelburg, P.C. (Vienna Univ. (Austria)). 1980. 4p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701765.

The problem of when a given solution to the supergravity field equations can be transformed to an Einstein vacuum solution by a supersymmetry gauge transformation is considered. It is shown that the conditions that infinitesimally gauge-related solutions are required to fullfill depend on the algebraic structure of the Riemann tensor. For general Petrov type I, type II and type D, these conditions are not only necessary but also sufficient and the explicit transformation can be given.

32288 **(UWThPh—80-06) Another definition for time delay.** Narnhofer, H. (Vienna Univ. (Austria)). 1980. 6p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701762.

Time delay is defined by geometrical considerations which work in classical as well as in quantum mechanics, and its connection with the S-matrix and the virial is proven for potentials with V(x vector) and x vector V(x vector) vanishing as rsup(-1-epsilon) for r → infinity.

32289 **(UWThPh—80-12) Translation-limit of a Poincare gauge theory of gravity.** Wallner, R.P. (Vienna Univ. (Austria)). 1980. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701766.

The field equations of a Poincare gauge theory proposed by the author are examined in the limit of vanishing Riemann-Cartan curvature and vanishing rotational coupling constant. It is shown that within this limit, torsion remains undetermined by the field equations and fades out to a mere gauge dependent function of the metric. In the case of 0(3) spherical symmetry this is exhibited explicitly, at the same time facing also the v.d. Heyde/Hehl theory with that topic.

32290 **(UWThPh—83-20) Schwarzschild superboost.** Aichelburg, P.C.; Embacher, F. (Vienna Univ. (Austria)). 1983. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701767.

A limiting procedure is applied to construct non-gauge solutions to the linearized spin-3/2 field in N=1 supergravity. The background metric represents a gravitational pp-wave arising from boosting the Schwarzschild line element to the speed of light, while the gravitino field is the induced limit of a pure gauge solution on the Schwarzschild background.

32291 **(UWThPh—83-22) Non-gauge spin-3/2 fields from supercovariantly constant spinors.** Aichelburg, P.C.; Gueven, R. (Vienna Univ. (Austria)). 1983. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701768.

We point out a limiting procedure which enables one to construct in supergravity theories non-gauge, linearized spin-3/2 fields with the aid of the supercovariantly constant spinors. We give an explicit application of the procedure for N=2 supergravity.

32292 **Kinetics of a first-order phase transition: Computer simulations and theory.** Penrose, O.; Lebowitz, J.; Marro, J.; Kalos, M.; Tobochnik, J. (Faculty of Mathematics, The Open University, Milton Keynes, England and Mathematics Department, Rutgers University, New Brunswick, New Jersey). *Journal of Statistical Physics;* **34**: No. 2, 399-426(Feb 1984). Contract AC02-76ER03077.

We have a quantitative comparison between the predictions of the Becker-Doering equations and computer simulations on a model of a quenched binary A-B alloy. The atoms are confined to the vertices of a simple cubic lattice, interact through attractive nearest neighbor interactions, and move by interchanges of nearest neighbor pairs (Kawasaki dynamics). We study in particular the time evolution of the number of clusters of A atoms of each size, at four different concentrations: rho/sub A/ = 0.035, 0.05, 0.075, and 0.1 atoms per lattice site. The temperature is 0.59 times the critical temperature. At this temperature the equilibrium concentration of A atoms in the B-rich phase is rho/sup eq//sub A/ = 0.0145 atoms/lattice site. The coefficients entering the Becker-Doering equations are obtained by extrapolation from previously published low-density calculations, leaving the time scale as the only adjustable parameter. We find good agreement at the three lower densities. At 10% density the agreement is, as might be expected, less satisfactory but still fairly good-indicating a quite wide range of utility for the Becker-Doering equations.

32293 **Finite particle number approach to physics.** Noyes, H.P. (Stanford Linear Accelerator Center, CA (USA)). pp 537-556 of Wave-particle dualism. A tribute to Louis de Broglie on his 90th birthday. Diner, S.; Fargue, D.; Lochak, G.; Selleri, F. (eds.) (Fondation Louis de Broglie, Paris, France). Dordrecht, Netherlands; D. Reidel (1984). (CONF-820473—).

From Symposium on wave particle dualism; Perugia, Italy (22 Apr 1982).

A preliminary version of this paper is available as SLAC-PUB--2906 (April 1982).

Starting from a discrete, self-generating and self-organizing, recursive model and self-consistent interpretive rules the author constructs: the scale constants of physics (3, 10, 137, 1.7x10^{38}); 3+1 Minkowski space with a discrete metric and the algebraic bound Δepsilon·Δtau >= 1; the Einstein-deBroglie relation; algebraic 'double slit' interference; a single time momentum space scattering theory connected to laboratory experience; an approximation to 'wave functions'; 'local' phase severence and hence both distant correlations and separability; baryon number, lepton number, charge and helicity; msub(p)/msub(e); a cosmology not in disagreement with current observations.

6580 Mathematical Physics

32294 **(LA-UR—84-344) Calculation of shock problems by using four different schemes.** Lee, W.H.; Whalen, P.P. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 12p. (CONF-840720—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84006032.

From International conference on numerical methods for transient and coupled problems; Venice, Italy (9 Jul 1984).

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Results are shown of the use of several different shock treatments in one- and two-dimensional Lagrangian code calculations of strong shock problems with known solutions. The shock treatments are (A) von Neumann-Richtmyer artificial viscosity; (B) Fixed length artificial viscosity; (C) Artificial energy diffusivity combined with artificial voscosity; and (D) Modified Godunov. The similarity test problems are plane and spherical implosions followed through a reflection. The problems are generated in the codes by imposing an inward directed velocity at one boundary of an initially, quiescent, gamma law gas with the other boundary fixed. Results are shown for calculations on uniform and non-uniform meshes. On non-uniform meshes, no method gives good results although method D is probably superior. Method B produces good appearing results with much shock smearing for the initial shock transit but the worst results after shock reflection. On uniform meshes, method C does the best job of handling the effects of shock initiation at boundaries while method A produces the worst results. Method D results in the smoothest flow field with less over-or-under-shooting, Gibbs phenomena. 14 references.

32295 **(LA-UR—84-1505) Quasi-invariance (rescaling) in nonlinear physics.** Munier, A.; Feix, M.R. (Los Alamos National Lab., NM (USA); Orleans Univ., 45 (France)). May 1984. Contract W-7405-ENG-36. 5p. (CONF-8405168—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012629.

From International colloquium on group theoretical methods in physics; College Park, MD, USA (21 May 1984).

Consider the following phase space-time transformation q/sup i/ = xi/sup i/C(t), p/sub i/ = π/sub i//C(t), THETA = THETA(t) where q/sup i/, p/sub i/, t and xi/sup i/, π/sub i/, THETA are the coordinate, momentum and time variables in the old and new space respectively, and where C(t) and THETA(t) are arbitrary functions of time. These transformations are shown to be generalized canonical transformations (GCT). The new variables reduce to the usual invariants of similarity solutions when such a transformation is found that leaves the governing equations strictly invariant. In most cases, for equations not completely integrable, no more than one group may usually be found. The invariants of the group are then used to absorb one independent variable, decreasing by one their number, but at the price of specializing initial conditions. For second order ordinary differential equations (including systems with friction), the method can be used to find strict or asymptotic invariants. We give two examples. The first deals with a one species plasma in cylindrical geometry embedded in a time-varying magnetic field for which the Brillouin flow is shown to be a general attractor. The second deals with the nonlinear heat-diffusion equation for which we compare the asymptotic solution to those obtained by self-similarity arguments.

32296 **(BNL-tr—1031) Numerical diffraction by a uniform grid.** Bamberger, A.; Guillot, J.C.; Joly, P. (Ecole Polytechnique, 91 - Palaiseau (France). Centre de Mathematiques Appliquees; Paris-13 Univ., 93 - Villetaneuse (France). Dept. de Mathematiques; Institut National de Recherche d'Informatique et d'Automatique (INRIA), Domaine de Voluceau, 78 - Rocquencourt (France)). 1984. Contract AC02-76CH00016. Translation source information not available . 164p. NTIS, PC A08/MF A01; 1; GPO Dep. Order Number DE84012861.

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In this report we analyze the influence of a spatial discretization on the propagation of a wave generated by a harmonic point source. We consider finite element and finite difference schemes on a uniform grid for the wave equation. We study the asymptotic behavior in space of the elementary solution of the associated Helmholtz equation. We look at the shape of the wave fronts and at the distribution of the amplitude along these fronts. We measure the anisotropy and the dispersion as function of the wave number and the mesh size. We derive results which complement those that have been obtained by plane wave analysis. Some of these results are classic in crystallography. The method of analysis is based on stationary phase techniques, commonly used in the theory of partial differential equations.

32297 **Lagrangian coordinates for moving boundary problems.** Wilson, D.G. (Union Carbide Corp., Nuclear Div., Oak Ridge, TN). *SIAM Journal on Applied Mathemadics;* **42**: No. 6, 1195-1201(Dec 1982). Contract W-7405-ENG-26.

Changes of density which occur naturally in phase change problems introduce movement of bulk material. It is customary in analyzing such problems to ignore this unpleasant complication and consider the densities to be equal. But for one-dimensional problems the complexities introduced by this bulk movement can easily be

circumvented. The key idea is posing the problem in local coordinates which are fixed in each phase. We show how to define suitable moving coordinates and, using them, pose and give an explicit solution for a one-dimensional, multi-phase Stefan problem with phases of distinct densities. This explicit solution is essentially a similarity solution in the local coordinates. However, the local coordinates could be used with finite element or finite difference schemes to analyze problems for which similarity solutions do not exist.

70 FUSION ENERGY

32298 **(RL—83-069) Fusion technology research.** Aram, J.H. (ed.). (Rutherford Appleton Lab., Chilton (UK)). 1983. 99p. (CONF-8209215—). NTIS (US Sales Only), PC A05/MF A01. Order Number DE84780162.

From Meeting of SERC research grant holders in fusion technology; Abingdon, UK (28 Sep 1982).

Abstracts of individual items from the proceedings were prepared separately for the data base. (DLC)

7001 Plasma Research

REFER ALSO TO CITATION(S) 32295, 32343, 32345, 32378, 32385

32299 **(CONF-840520—3) Use of isotopically-enriched carbon probes for erosion/deposition measurements in the ASDEX divertor.** Roberto, J.B.; Roth, J.; Taglauer, E.; Holland, O.W. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.); Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 16p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012329.

From 6. international conference on plasma surface interactions in controlled fusion devices; Nagoya, Japan (14 May 1984).

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An isotopic marker technique has been developed and used to measure near-surface erosion and carbon and impurity deposition on graphite samples in the ASDEX divertor chamber. Papyex graphite strips were enriched to ~ 20% ^{13}C over the first 1000 A by ion implantation. The implanted ^{13}C can be clearly distinguished from ^{12}C of the host by Rutherford backscattering using 2.7 MeV ^{4}He. Carbon erosion and deposition were determined from changes in the depth distribution of the ^{13}C, and impurity accumulation was also monitored in the backscattering spectrum. The ^{13}C profiles remained sharp in spite of high heat fluxes to the samples (sufficient to melt stainless steel), and the results showed clear evidence of simultaneous erosion and deposition of carbon and impurities. During 2.4 MW neutral injection, net carbon erosion exceeded 250 A/s in the divertor throat. High carbon erosion was also observed during periods of substantial Fe and Ti impurity accumulation on the samples. The results demonstrate the applicability of the ^{13}C technique for measuring erosion/deposition at high-heat-flux surfaces such as limiters or divertor plates.

32300 **(CONF-8405170—1) Effects of preionization by electron cyclotron heating in INTOR.** England, A.C.; Eldridge, D.C. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 12p. NTIS, PC A02; 1; GPO Dep. Order Number DE84012332.

From ETR-INTOR workshop; Atlanta, GA, USA (1 May 1984).

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A model has been developed for the electron cyclotron heating (ECH) preionization and startup effects on the ISX-B tokamak. This model has satisfactory agreement with most of the observed phenomena on ISX-B. The model has been applied to INTOR under the assumption that sufficient power at a frequency commensurate with this device will be on hand. We have assumed the following parameters for INTOR: R = 5.3 m,a = 1.52 m, B/sub t/ = 6 T, and a maximum applied loop voltage of 35 V. The results suggest that moderate amounts of preionization will aid in the start up by allowing a reduction in the applied loop voltage, V/sub l/, will save some transformer flux, and will permit a more rapid current ramp. Massive preionization (≧ 1 MW) does not appear to be necessary.

32301 **(DOE/DP/40124—32) Observation of scattered light between omega/2 and 3/2 omega in short wavelength laser produced plasmas.** Goldman, L.M.; Seka, W.; Tanaka, K.; Simon, A.; Short, R. (Rochester Univ., NY (USA). Lab. for Laser Energetics). 1984. Contract AC08-80DP40124. 15p. (CONF-8405163—3). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012533.

From Anomalous absorption conference; Charlottesville, VA, USA (6 May 1984).

Extensive measurements have been carried out on scattered radiation in the spectral region between omega/2 and 3/2 omega from plasmas produced by 351 nm lasers. The relative intensities of the continuum radiation relative to the line features at omega/2 and 3/2 omega will be shown. A new spectral feature has been observed between 3/2 omega and omega which may be interpreted as an upscattered component produced by ordinary Raman scattering. The overall experimental evidence for ordinary Raman scattering vs stimulated Raman scattering will be discussed.

32302 **(DOE/DP/40124—36) Nonlinear saturation of the parametric instability for three coupled oscillators.** Simon, A.; McKinstrie, C.J.; Williams, E.A. (Rochester Univ., NY (USA). Lab. for Laser Energetics). 11 May 1984. Contract AC08-80DP40124. 15p. (CONF-8405163—4). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012488.

From Anomalous absorption conference; Charlottesville, VA, USA (6 May 1984).

The case of three parametrically coupled and damped oscillators is considered. One (with natural frequency ω_0) is externally driven at a frequency Ω close to the sum ($\omega_1 + \omega_2$) of the other two. In the vicinity of the parametric instability threshold, we determine the time-asymptotic oscillator amplitudes and nonlinear frequency shifts by using secular-free perturbation analysis. The resulting amplitudes are sensitive to the mismatch $\delta (= \Omega - \omega_1 - \omega_2)$, if Ω and ω_0 are dissimilar, and rise sharply as $\delta \rightarrow 0$. If Ω is close to ω_0, the behavior is quite insensitive to δ, and models results obtained for parametric instabilities in plasma. The single parametrically-driven oscillator threshold result is also obtained and compared to a general small amplitude result of Landau. This Landau result is then generalized to two coupled oscillators and compared to a result obtained by perturbation analysis. These two cases all behave as the three-oscillator does when ω_0 and Ω are dissimilar. All solutions are shown to be stable.

32303 **(DOE/DP/40124—38) Nonlocal heat transport by non-Maxwellian electrons.** Swartz, K.; Short, R.W (Rochester Univ., NY (USA). Lab. for Laser Energetics). 30 Mar 1984. Contract AC08-80DP40124. 8p. (CONF-8405163—2). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012391.

From Anomalous absorption conference; Charlottesville, VA, USA (6 May 1984).

The generalization of the Spitzer-Harm solution to steep density and temperature gradients requires the computation of the appropriate non-Maxwellian isotropic part of the electron distribution. We develop analytic solutions for a steady state, high-Z plasma, employing the diffusion approximation. Applications of our solution include computation of the resulting heat flux, thermal smoothing of transverse temperature perturbations, and modification of linear heat flow instabilities.

32304 **(DOE/ER/53140—14) Monte Carlo studies of tandem mirror plasmas interacting with waves in the Ion Cyclotron Range of Frequencies (ICRF). Progress report, October 1, 1982-May 18, 1984.** Todd, A.M.M. (Grumman Aerospace Corp., Princeton, NJ (USA)). May 1984. Contract AC02-82ER53140. 20p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012390.

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A study of rf fueling, rf anchor, hot electron anchor, rf start up and rf-sustained mode operation in Tandem Mirrors has been completed. Significant results include finding little performance difference between inboard and outboard antenna location, and an optimum central cell electron to ion temperature ratio of between one and two. TARA hot electron anchor results compare well with the predictions of Kesner et al, but suggest that the ICRF resonance

should be located at the potential peak. Several variance reduction techniques, improved rf operators and a Monte Carlo neutral model have been incorporated in the code, which has also been converted and optimized for NMFECC Cray operation. On going activities include studies of central cell ICRF heating and the application of Monte Carlo non-Maxwellian scattering operators.

32305 **(DOE/ER/53162—3) Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas. Annual progress report, September 14, 1983-May 14, 1984.** Imre, K. (City Univ. of New York, NY (USA)). May 1984. Contract AC02-83ER53162. 7p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012396.

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The coupling of the extra-ordinary and the quasi-electrostatic modes at the second electron cyclotron resonance for a weakly relativistic plasma is investigated, in order to evaluate the effectiveness of the ECRH mechnism to pre-heat the plasma. When the propagation is nearly perpendicular to the external magnetic field, and the plasma density is sufficiently high we find a strong coupling between these waves. In a critical interval of density the geometrical optics model predicts a 100% mode conversion for waves crossing the resonance layer. It is shown that this model fails within a small boundary layer near the resonance, thus requiring a full-wave analysis in this region. The linearized relativistic Vlasov equation is solved in the inner region, and field equations valid within the boundary layer are derived. The outer region is treated using the standard geometrical optics method. The inner solutions are matched to the outer solutions in the usual manner. We have also derived appropriate energy flux theorems so that the energy associated with the wave and the particles can be distinguished.

32306 **(DOE/ET/51013—117) Solution of the relativistic 2-D Fokker-Planck equation for LH current drive.** Hizanidis, K.; Hewett, D.W.; Bers, A. (Massachusetts Inst. of Tech., Cambridge (USA). Plasma Fusion Center; Lawrence Livermore National Lab., CA (USA)). Mar 1984. Contract AC02-78ET51013. 9p. (CONF-840311—7; PFC/CP—84-4). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84010308.

From 4. international symposium on heating in toroidal plasmas; Rome, Italy (21 Mar 1984).

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We solve numerically the steady-state two-dimensional relativistic Fokker-Planck equation with strong rf diffusion using spectra relevant to recent experiments in ALCATOR-C. The results (current generated, power dissipated, and the distribution of energetic electrons) are sensitive to the location of the spectrum in momentum space. Relativistic effects play an important role, especially for wide spectra. The dependence on the ionic charge number Z/ sub i/ is also investigated. Particular attention is paid to the perpendicular temperature inside the resonant region and beyond, as well as to the angular energetic particle-temperature distribution, T/sub μ/, a function of the pitch angle parameter μ. The dependence of the perpendicular temperature on the location of the spectrum is also investigated analytically with a model based on the method of moments and the results compared with those found numerically.

32307 **(DOE/ET/53051—63) Disruptive instabilities in a poloidal divertor tokamak.** Osborne, T.H. (Wisconsin Univ., Madison (USA)). Feb 1984. Contract AC02-76ET53051. 137p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84013054.

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Tokamak discharges are observed with safety factor, q, as low as 0.5 over most of the current channel within the poloidal divertor separatrix. These discharges show sawtooth oscillations, but magnetic probe measurements indicate the central q values, instead of relaxing to 1, remain nearly fixed. The $q = 1$ surface for this case is very near the separatrix, and there is a small oscillation in q near the $q = 1$ surface which is time correlated with the sawtooth oscillations. The observation of discharges which maintain $q < 1$ is at variance with the usual resistive MHD theory of sawtooth oscillations. These discharges have poor energy confinement (tau/sub E/ < 50 μs). If $q = 1$, sawtooth oscillations are observed in which the disruption (sawtooth crash) itself has an $n = m = 1$ helical structure. At low toroidal plasma current and high toroidal field, several small sawteeth of period 100 to 200 μs are superimposed on giant sawteeth of period 1ms. Precursor oscillations with even m and odd n are observed on magnetic loops for both types of sawtooth oscillations. As the plasma current is increased with the toroidal magnetic field constant, the giant sawteeth become less regular. At large enough plasma current, only small sawtooth oscillations are observed; these show an $m = n = 1$ precursor in the soft x-ray. An MHD equilibriumm code predicts that the $q = 2$ surface is very near the divertor separatrix for this case. This suggests that the $m = 2$, $n = 1$ disruption may be eliminated by the proximity of the $q = 2$ surface and the separatrix. These discharges have good energy confinement time (tau = 600 μs).

32308 **(DOE/ET/53051—65) Second harmonic electron cyclotron emission studies of Tokapole-II plasmas.** Sengstacke, M.A. (Wisconsin Univ., Madison (USA)). Mar 1984. Contract AC02-76ET53051. 132p. NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84013103.

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The electron temperature is an important parameter in plasma physics. The intensity of electron cyclotron emission (ECE) is a function of the electron temperature. This function reduces to a direct proportionality for optically thick plasmas. Thus a study of ECE can help us understand various plasma properties. The principal diagnostic used is a radiometer consisting of a microwave superheterodyne receiver operating in the K band, (26.5,40) GHz, and fed by a three inch parabolic mirror with a spot size of about 4.4 cm. The entire microwave assembly can be rotated through 90° about the mirror axis to facilitate polarization measurements. A ray tracing analysis of Tokapole-II shows that refraction is significant for plasmas observed in this work.

32309 **(DOE/ET/53051—66) Experimental observation of the shear Alfven resonance in a tokamak.** Witherspoon, F.D.; Prager, S.C.; Sprott, J.C. (Wisconsin Univ., Madison (USA). Dept. of Physics). May 1984. Contract AC02-76ET53051. 18p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012993.

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Experiments in Tokapole II have demonstrated the shear Alfven resonance in a tokamak by direct probe measurement of the wave magnetic field within the plasma. The resonance is driven by external antennas and is identified as radially localized enhancements of the poloidal wave magnetic field. The radial location agrees with calculations which include toroidicity and noncircularity of the plasma cross-section. Other properties such as polarization, radial width, risetime, and wave enhancement also agree with MHD theory.

32310 **(DOE/ET/53088—132) Interaction of the precessional wave with free-boundary Alfven surface waves in tandem mirrors.** Berk, H.L.; Kaiser, T.B. (Texas Univ., Austin (USA). Inst. for Fusion Studies; Lawrence Livermore National Lab., CA (USA)). Apr 1984. Contract FG05-80ET53088. 29p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012527.

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We consider a symmetric tandem mirror plugging a long central cell, with plugs stabilized by a hot component plasma. The system is taken to have a flat pressure profile with a steep edge gradient. We then consider the interaction of the precessional mode with Alfven waves generated in the central cell. This analysis is non-eikonal and is valid when $m\Delta/r < 1$ (m is the azimuthal mode number. r the plasma radius and Δ the radial gradient scale length) for long-wavelength radial modes. We find that without FLR effects the precessional mode is always destabilized by the excitation of the Alfven waves for $m \geqq 2$. For $m=1$, it is possible to achieve stabilization with conducting walls. A discussion is given of how FLR affects stabilization of the $m \geqq 2$ long-wavelength modes and of finite-Larmor-radius stabilization of modes described in the eikonal approximation.

32311 **(GA-A—17528) High power neutral beam heating on Doublet III.** Overskei, D.O.; Armentrout, C.J.; Baur, J.F.; Blau, F.P.; Bramson, G.; Burrell, K.H.; Chase, R.P.; DeBoo, J.C.; Ejima, S.; Fairbanks, E.S. (GA Technologies, Inc., San Diego, CA (USA)). Mar 1984. Contract AT03-84ER51044. 22p. (CONF-840311—13). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012471.

From 4. international symposium on heating in toroidal plasmas; Rome, Italy (21 Mar 1984).

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Energy confinement studies with up to 7.5 MW of neutral beam heating power have been performed on the Doublet III tokamak. We have found that during beam injection divertor operation results in up to a factor of two improvement in energy confinement as compared to comparable limiter discharges. In both configurations the confinement improves linearly with plasma current. In addition, there are indications that a new plateau in energy confinement time is reached with injection at high power levels. In all configurations electron transport is the major heat loss channel. Transport analysis indicates that the electron thermal conductivity is typically a factor of 2 to 3 lower in diverted discharges as compared to comparable limiter discharges. However, there are indications that the plasma edge may be important since improved confinement is correlated with the separation between the limiter and the separatrix.

32312 **(GEPP-TIS—802) Review of anode phenomena in vacuum arcs.** Miller, H.C. (General Electric Co., St. Petersburg, FL (USA). Neutron Devices Dept.). 4 Jun 1984. Contract AC04-76DP00656. 46p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012371.

This paper reviews anode phenomena in vacuum arcs. It discusses arc modes at the anode, anode temperature measurements, anode ions, transitions of the arc into various modes (principally the anode spot mode), and theoretical explanations of anode phenomena. A vacuum arc can exhibit five anode discharge modes: (1) a low current mode in which the anode is basically passive, acting only as a collector of particles emitted from the cathode; (2) a second low current mode that can occur if the electrode material is readily sputtered (a flux of sputtered atoms will be emitted by the anode); (3) a footpoint mode, characterized by the appearance of one or more luminous spots on the anode (footpoints are much cooler than the true anode spots present in the last two modes); (4) an anode spot mode in which one large or several small anode spots are present (such spots are very luminous, have a temperature near the atmospheric boiling point of the anode material, and are a copious source of vapor and ions); and (5) an intense arc mode where an anode spot is present, but accompanied by severe cathode erosion. The arc voltage is relatively low and quiet in the two low current modes and the intense arc mode. It is usually high and noisy in the footpoint mode, and it can be either in the anode spot mode. Anode erosion is low, indeed negative, in the two low current modes, and it is low to moderate in the footpoint mode. Severe anode erosion occurs in both the anode spot and intense arc modes.

32313 **(GTFR—46) Investigation of neutral beam driven impurity flow reversal as an impurity control method in future tokamaks.** Bennett, R.B.; Stacey, W.M. Jr. (Georgia Inst. of Tech., Atlanta (USA)). Mar 1984. Contract AS05-78ET52025. 28p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84008855.

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A theory for the effect of directed neutral beam injection on impurity transport in tokamaks is extended to include temperature gradient effects. The extended theory is compared with experimental data, from PLT, and certain coefficients are adjusted to provide agreement. The adjusted theory is applied to assess the potential of NBI being used to prevent impurities from penetrating to the center of future tokamak plasmas, thereby possibly creating a cold radiating edge. The results indicate the possibility of creating a cold radiating edge in TETR and in future tokamaks represented by FED and STARFIRE.

32314 **(GTFR—47) Rotation and impurity transport in a tokamak plasma with directed neutral beam injection.** Stacey, W.M. Jr.; Sigmar, D.J. (Georgia Inst. of Tech., Atlanta (USA); Oak Ridge National Lab., TN (USA)). Feb 1984. Contract AS05-78ET52025. 32p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84008014.

We have extended our previous collisional-regime theory for rotation and impurity transport in a tokamak plasma with strong, directed NBI and strong rotation (v/sub phi/ ~ v/sub th/) to the plateau regime. We present a kinetic theory derivation of the parallel viscous force in the strong rotation ordering and a self-consistent formalism for calculating ion and impurity rotation velocities and radial transport fluxes, as well as the radial electric field and the poloidal variation of the impurity density upon which the former strongly depend. Calculations for model problems representative of ISX-B and PLT are presented. The predicted impurity transport exhibits features in agreement with experimental observations.

32315 **(INIS-mf—4754(No.23)) International bulletin on atomic and molecular data for fusion. No. 23.** Katsonis, K. (ed.). (International Atomic Energy Agency, Vienna (Austria). Atomic and Molecular Data Unit). Sep 1983. 61p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84780366.

This bulletin deals with atomic and molecular data for fusion. A bibliography for the most recent data presented in the document is provided. Work in progress is briefly reported (OIV in temperature and density diagnostics, measured cross section for electron impact ionization of Iron and Tungsten).

32316 (INIS-mf—8901, pp 309-313) **Surface probe measurements in ISX-B and EBT-S.** Zuhr, R.A. (Oak Ridge National Lab., TN (USA)). 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84701920. (CONF-830120—Exc.).

From Symposium on surface science; Obertraun, Austria (30 Jan 1983).

A series of in situ surface deposition probe measurements has been made on the ISX-B tokamak and the Elmo bumpy torus EBT-S. Surface deposition probe techniques have been shown to be an effective means of determining the characteristics of the plasma edge region of magnetic confinement devices. Experimental results on ISX-B and EBT-S have led to a consistent picture of the edge plasma and the dominant impurity introduction mechanisms. This picture is supported by numerous other measurements and emphasizes the importance of concentrating several techniques on the complex problems of plasma fusion.

32317 **(LA-UR—84-1077) Nonthermal effects on the diagnostics of a collapsing gas shell Z-pinch.** Jones, L.A.; Kania, D.R. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 10p. (CONF-8403100—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84009996.

From Conference of Z-pinches for fusion; Alexandria, VA, USA (29 Mar 1984).

The collapsing gas shell Z-pinch at Los Alamos is powered by a 72 kJ - 600 kV Marx bank. This Marx bank consists of twelve six-stage modules which are used to pulse charge a 1 Ω-90 ns long water line in ~ 500 ns. The plasma produced by this device has been well diagnosed, but rather than present the results of all the diagnostics, we will discuss only those relevant to nonthermal effects. First, we show a spectrum taken with a 1 m VUV spectrograph. A section of the spectrum has been microdensitometered to show that we observe Ar X-XIII in this spectrum. This same instrument was used to image the spectrum both axially and radially. The same portion of the spectrum discussed above is shown along with a time integrated, filtered (1 to 6 keV) x-ray pinhole picture. These pictures show that the collapsed plasma is axially inhomogenous, i.e., He-like argon, represented by the x-ray pinhole picture, forms in hot spots along the axis and lower ionization stages fill in the regions between the hot spots. Next we present a spectrum taken with a curved crystal instrument. This spectrum shows the argon XVII, He-like resonance and intercombination lines, along

with satellite structures from argon X to XVI. Another part of the spectrum contains weak H-like lines.

32318 **(PPPL—2109) Studies of thermal energy confinement scaling in PDX plasmas: $D^0 \rightarrow H^+$ limiter discharges.** Kaye, S.M.; Goldston, R.J.; Bell, M.; Bol, K.; Bitter, M.; Fonck, R.; Grek, B.; Hawryluk, R.J.; Johnson, D.; Kaita, R. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jun 1984. Contract AC02-76CH03073. 102p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84013051.

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Experiments were performed on the PDX tokamak to study plasma heating and β scaling with higher power, near-perpendicular neutral beam injection. The data taken during these experiments were analyzed using a time-dependent data interpretation code (TRANSP) to study the transport and thermal confinement scaling over a wide range of plasma parameters. This study focuses on results from experiments with D^0 injection into H^+ plasmas using graphite rail limiters, a = 40 to 44 cm, R = 143 cm, I/sub p/ = 200 to 480 kA, B/sub T/ = 0.7 to 2.2 T, and typically anti n/sub e/ = 2.5 to 4.2 x 10^{13} cm^{-3}. The results of this study indicate that for both ohmic and neutral beam heated discharges the energy flow out of the plasma is dominated by anomalous electron losses, attributed to electron thermal conduction. The ion conduction losses are well described to electron thermal conduction. The ion conduction losses are well described by neoclassical theory; however, the total ion loss influences the power balance significantly only at high toroidal fields and high plasma currents.

32319 **(SAI—84-1606/PRI-78) Generalized gyrokinetics.** Bernstein, I.B.; Catto, P.J. (Yale Univ., New Haven, CT (USA); Science Applications, Inc., Boulder, CO (USA). Plasma Research Inst.). May 1984. Contract AC03-76ET53057. 38p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012795.

A nonlinear gyrokinetic formalism is developed which permits mean velocities comparable to thermal speeds in arbitrary magnetic field geometry. The theory is fully electromagnetic and does not employ an eikonal ansatz. The freedom in the theory is exploited to display simply the connection with ideal magnetohydrodynamics.

32320 **(SAI—84-3028/PRI-73) Particle loss rates from electrostatic wells of arbitrary mirror ratios.** Catto, P.J.; Li, X.Z. (Science Applications, Inc., Boulder, CO (USA). Plasma Research Inst.). Mar 1984. Contract AC03-76ET53057. 24p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84008940.

Single integral expressions for the particle loss rate from an electrostatic trap with Zephi$_0$/t much $\geqq$ 1 are derived which span all possible mirror ratios R, where phi$_0$, Z, and T are the potential well depth, charge number, and species temperature. The two expressions are shown to be identical for a range of intermediate R so that one expression is valid for small to intermediate R (R $\leqq$ 1), while the other is appropriate from intermediate to large R (R much $\geqq$ T/Zephi$_0$). Three particularly simple analytic limits are found to exist: (i) R much $\leqq$ T/Zephi$_0$, (ii) T/Zephi$_0$ much $\leqq$ R $\leqq$ 1, and (iii) R $\geqq$ 1.

32321 **(SAND—83-2641C) Energy-resolving carbon resistance probes for plasma edge characterization.** Wampler, W.R. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 13p. (CONF-840520—4). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012235.

From 6. international conference on plasma surface interactions in controlled fusion devices; Nagoya, Japan (14 May 1984).

The resistance increase in thin carbon films caused by energetic particle bombardment has been developed into a new device, the carbon resistance probe, to measure the energy and flux of particles at the edge of a plasma. In the present work we have calibrated this probe by ion implantation of hydrogen and deuterium with energies from 20 to 1600 eV, and have demonstrated sensitivity to particles with energies as low as 30 eV. Calibrations are also presented for thin-layer resistance probes, a new configuration in which energy resolution is obtained using carbon films and ranging overlayers comparable in thickness to the range of the particles. The results show that thin-layer probes can be used to measure the particle energies and fluxes typically encountered at the first wall of a tokamak.

32322 **(SAND—83-8236) Mechanical device for enhancing halo density in the TMX-U tandem mirror.** Hsu, W.L.; Barr, W.L.; Simonen, T.C. (Sandia National Labs., Livermore, CA (USA); Lawrence Livermore National Lab., CA (USA)). Apr 1984. Contract AC04-76DR00789. 27p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012224.

The halo recycler, a mechanical device similar to pumped limiters used in tokamaks, is studied as a means of enhancing the halo plasma density in the Tandem Mirror Experiment Upgrade (TMX-U). The recycler structure consists of an annular chamber at each end of the tandem mirror device where the halo plasma is collected. The halo plasma density is increased by recycling the halo ions as they are neutralized by the collector plate. With sufficient power fed into the halo electrons, the recycler can sustain an upstream electron temperature of 30 eV for effective halo shielding while maintaining a low temperature of 5 eV near the collector plate to reduce sputtering. A power flow model has shown that the required power for heating the halo is low enough to make the halo recycler a practical concept.

32323 **(UCID—20026) Impurity characteristics of TMX-U.** Allen, S.L.; Yu, T.L.; Nash, T.J. (Lawrence Livermore National Lab., CA (USA)). 1 May 1984. Contract W-7405-ENG-48. 38p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012413.

A study of the concentrations, radiated power, and sources of impurities in the TMX-U plasma is presented. Three extreme ultraviolet (EUV) instruments were used: one monochromator that measures time-resolved radial profiles of a particular impurity line, and two time-resolving spectrographs that measure the time histories of several impurity lines in a single shot. The major impurities found in the TMX-U plasma are carbon, nitrogen, and oxygen. Titanium and silicon are also observed. The impurity concentrations are low, less than 1% and the radiated power is a small fraction of the input power. The major source of oxygen and nitrogen is the neutral beam injector. Wall conditioning, such as glow discharge cleaning and titanium gettering, decreases the impurity concentrations, particularly carbon. There does not seem to be an accumulation of impurities in the thermal barrier region under the present plasma conditions. Future experiments are discussed.

32324 **(UCRL—89202) Evaluating and tuning system response in the MFTF-B control and diagnostics computers.** Palasek, R.L.; Butner, D.N.; Minor, E.G. (Lawrence Livermore National Lab., CA (USA)). 30 Nov 1983. Contract W-7405-ENG-48. 8p. (CONF-831203—142). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012603.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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The software system running on the Supervisory Control and Diagnostics System (SCDS) of MFTF-B is, for the major part, an event driven one. Regular, periodic polling of sensors' outputs takes place only at the local level, in the sensors' corresponding local control microcomputers (LCC's). An LCC reports a sensor's value to the supervisory computer only if there was a significant change. This report is passed as a message, routed among and acted upon by a network of applications and systems tasks within the supervisory computer (SCDS). Commands from the operator's console are similarly routed through a network of tasks, but in the opposite direction to the experiment's hardware. In a network such as this, response time is partialy determined by system traffic. Because the hardware of MFTF-B will not be connected to the computer system for another two years, we are using the local control computers to simulate the event driven traffic that we expect to see during MFTF-B operation. In this paper we show how we are using the simulator to measure and evaluate response, loading, throughput, and utilization of components within the computer system. Measurement of the system under simulation allows us to identify bottlenecks and verify their unloosening. We also use the

traffic simulators to evaluate prototypes of different algorithms for selected tasks, comparing their responses under the spectrum of traffic intensities.

32325 **(UCRL—89221) Design of the plasma current sensor diagnostic for MFTF-B.** Goerz, D.A.; House, P.A.; Wells, C.W. (Lawrence Livermore National Lab., CA (USA)). 23 Nov 1983. Contract W-7405-ENG-48. 6p. (CONF-831203—149). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012540.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

The Plasma Current Sensor (PCS) diagnostic includes large diamagnetic loops (DL) that fully encircle the plasma as well as small multi-turn pickup coils (PCs) located between the plasma and the superconducting magnets. Both types of sensors respond to changing magnetic flux linkages caused by plasma currents and are used to measure plasma diamagnetism, from which estimates of temperature and density can be made. The DLs are used in the central cell and Axicell regions, while the PCs are used in the Yin-yang regions where DLs are impractical. Other PCs are used in the central cell to detect axial plasma currents, to help tune trim coils in the transition cell and confirm theoretical estimates of radial diffusion limits. This paper describes the PCS diagnostic and presents the detailed mechanical and electrical designs.

32326 **(UCRL—89222) Local area network for the plasma diagnostics system of MFTF-B.** Lau, N.H.; Minor, E.G. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 7p. (CONF-831203—140). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012601.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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The MFTF-B Plasma Diagnostics System will be implemented in stages, beginning with a start-up set of diagnostics and evolving toward a basic set. The start-up set contains 12 diagnostics which will acquire a total of about 800 Kbytes of data per machine pulse; the basic set contains 23 diagnostics which will acquire a total of about 8 Mbytes of data per pulse. Each diagnostic is controlled by a Foundation System consisting of a DEC LSI-11/23 microcomputer connected to CAMAC via a 5 Mbits/second serial fiber-optic link and connected to a supervisory computer (Perkin-Elmer 3250) via a 9600 baud RS232 link. The Foundation System is a building block used throughout MFTF-E for control and status monitoring. However, its 9600 baud link to the supervisor presents a bottleneck for the large data transfers required by diagnostics. To overcome this bottleneck the diagnostics Foundation Systems will be connected together with an additional LSI-11/23 called the master to form a Local Area Network (LAN) for data acquisition.

32327 **(UCRL—89224) Electrical grounding, shielding, and isolation for the MFTF-B plasma diagnostic system.** Deadrick, F.J. (Lawrence Livermore National Lab., CA (USA)). 28 Nov 1983. Contract W-7405-ENG-48. 5p. (CONF-831203—150). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012539.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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The electrical grounding, shielding, and isolation of plasma diagnostics on the Mirror Fusion Test Facility (MFTF-B) is a key part of the overall design. The Electromagnetic Interference (EMI) environment in which the Plasma Diagnostics System (PDS) will be required to operate is very harsh. The electrical grounding and shielding design which is being implemented to cope with this environment follows one which has been used successfully on the Tandem Mirror Experiment (TMX). Details of the MFTF-B plasma diagnostics facility, equipment grounding, shielding and isolation, and the cabling system are described in this paper.

32328 **(UCRL—89283) Design of the electromagnetic fluctuations diagnostic for MFTF-B.** House, P.A.; Goerz, D.A.; Martin, R. (Lawrence Livermore National Lab., CA (USA)). 28 Nov 1983. Contract W-7405-ENG-48. 6p. (CONF-831203—151). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012541.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

The Electromagnetic Fluctuations (EMF) diagnostic will be used to monitor ion fluctuations which could be unstable in MFTF-B. Each probe assembly includes a high impedance electrostatic probe to measure potential fluctuations, and a group of nested, single turn loops to measure magnetic fluctuations in three directions. Eventually, more probes and loops will be added to each probe assembly for making more detailed measurements. The sensors must lie physically close to the plasma edge and are radially positionable. Also, probes at separate axial locations can be positioned to connect along the same magnetic field line. These probes are similar in concept to the rf probes used on TMX, but the high thermal load for 30-second shots on MFTF-B requires a water-cooled design along with temperature monitors. Each signal channel has a bandwidth of .001 to 150 MHz and is monitored by up to four different data channels which obtain amplitude and frequency information. This paper describes the EMF diagnostic and presents the detailed mechanical and electrical designs.

32329 **(UCRL—89474) Report on the experience with the Supervisory Control and Diagnostics System (SCDS) of MFTF-B.** Wyman, R.H. (Lawrence Livermore National Lab., CA (USA)). 18 Nov 1983. Contract W-7405-ENG-48. 7p. (CONF-831203—145). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012599.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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The Supervisory Control and Diagnostics System (SCDS) of MFTF is a multiprocessor computer system using graphics oriented displays with touch sensitive panels as the primary operator interface. Late in the calendar year 1981 the system was used to control an integrated test of the vacuum vessel, vacuum system, cryogenics system and the superconducting magnet of MFTF. Since the completion of those tests and starting in early calendar 1983 the system has been used for control of the neutral beam test facility at LLNL. This paper presents a short overview of SCDS for the purpose of orientation and then proceeds to describe the difficulties encountered in these preliminary encounters with reality. The band-aids used to hold things together as disaster threatened as well as the long-term solutions to the problems will be discussed. Finally, we will present some comments on system costs and management philosophy.

32330 **(UCRL—98355) Design and prototype results of a far-infrared interferometer for MFTF-B.** Monjes, J.A.; Throop, A.L.; Thomas, S.R.; Peebles, A.; Zu, Qin-Zin. (Lawrence Livermore National Lab., CA (USA); California Univ., Los Angeles (USA)). 30 Nov 1983. Contract W-7405-ENG-48. 8p. (CONF-831203—157). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012591.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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A Far-Infrared (FIR) Laser Interferometer (FLI), operating at 185 μm wavelength is planned as part of the initial start-up set of plasma diagnostics for the Mirror Fusion Test Facility (MFTF-B). The FLI will consist of a heterodyne, three-chord laser interferometer which will be used initially to measure line-integrated plasma density in the high-density, center cell region of the machine. The conceptual system design and analysis has been completed. There are several unique environmental/physical constraints and performance requirements for this system which have required that technology-evaluation and prototyping experiments be completed to support the design effort and confirm the expected performance parameters. Issues which have been addressed include extensive use of long-path dielectric waveguide, coupling and control of free-space propagation of the beam, and polarization control. The results and

conclusions of the design analysis and experimental measurements will be presented.

32331 **Initial confinement studies of ohmically heated plasmas in the tokamak fusion test reactor.** Efthimion, P.C.; Bell, M.; Blanchard, W.R.; Bretz, N.; Cecchi, J.L.; Coonrod, J.; Davis, S.; Dylla, H.F.; Fonck, R.; Furth, H.P. (Plasma Physics Laboratory, Princeton University, Princeton, New Jersey 08544). *Physical Review Letters;* **52**: No. 17, 1492-1495(23 Apr 1984). Contract AC02-76CH03073.

Initial operation of the tokamak fusion test reactor has concentrated upon confinement studies of ohmically heated hydrogen and deuterium plasmas. Total energy confinement times (tau/sub E/) are 0.1—0.2 s for a line-average density range (n-bar/sub e/) of (1—2.5) x 10^{19} m^{-3} with electron temperatures of T/sub e/(o)~1.2—2.2 keV, ion temperatures of T/sub i/(0)~0.9—1.5 keV, and Z/sub eff/~3. A comparison of Princeton large torus, poloidal divertor experiment, and tokamak fusion test reactor plasma confinement supports a dimension-cubed scaling law.

32332 **Two-plasmon decay and three halves harmonic generation in filaments in a laser-produced plasma.** Short, R.W.; Seka, W.; Tanaka, K.; Williams, E.A. (Laboratory for Laser Energetics, University of Rochester, Rochester, New York 14627). *Physical Review Letters;* **52**: No. 17, 1496-1499(23 Apr 1984). Contract AC08-80DP40124.

The two-plasmon decay of light propagating in filaments in a laser-produced plasma and the resulting $3\omega_0/2$ light emission is discussed with use of a simplified model. Experimental observations are consistent with the predictions of the model. Implications for use of the $3\omega_0/2$ doublet splitting as a temperature diagnostic are discussed.

32333 **(CTO—2199) Possibility of using pulsed CO_2 lasers for radiation scattering diagnostics in tokamak plasmas.** Zhukovskii, V.G. (UKAEA Culham Lab., Abingdon; Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). Jan 1984. Translation of IAE—3351/7 (1980). 73p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84901207.

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The possibility is discussed of using pulsed CO_2 lasers for measuring basic plasma parameters by the scattering method. In addition to measuring the electron temperature and density one can determine the ion temperature and the effective plasma charge (Z/sub eff/) by small-angle scattering. The use of pulse-periodic CO_2 lasers makes it possible to achieve a multipulse operating regime and thereby to investigate the time dependences of the measured plasma parameters.

32334 **Electron temperature limit for poloidal equilibrium and tokamak containment scaling.** Ware, A.A. (Texas Univ., Austin (USA). Inst. for Fusion Studies). *Comments on Plasma Physics and Controlled Fusion;* **7**: No. 6, 199-205(May 1983).

The experimentally observed scaling laws for the electron temperature (Tsub(eo)) and energy containment time (Tsub(Ec)) with ohmic heating are derived from the two conditions: (a) the predicted critical Tsub(eo) for loss of poloidal equilibrium and (b) the proportionality of the ion heat flux to the Pynting vector. Condition (b) is inferred from the large fraction of ohmic power shown to be transferred to the ions.

32335 **Sizeable Raman scatter in laser plasma experiments.** Kruer, W.L. (Lawrence Livermore National Lab., CA (USA)). *Comments on Plasma Physics and Controlled Fusion;* **7**: No. 6, 215-223(May 1983).

Consistent with theoretical expectations, significant levels of Raman scattered light have been observed in some recent experiments with sizeable regions of underdense plasma. A brief overview of these results is given.

32336 **(ORNL-tr—5128) MHD stability of corrugated toroidal systems.** Mikhailovskii, A.B. (Oak Ridge National Lab., TN (USA); Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1983. Contract AC05-84OR21400. Translation of Report No. IAE—3720/6 (1983). 17p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012994.

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Current MHD-stability theory has at its disposal ample results of studies on toroidal systems with round magnetic surfaces and longitudinal-homogeneous magnetic field. A significant quality of the corresponding cycle of studies is allowance for the effects of the final plasma pressure. The concept of a closed system of the Drakon (long-equilibrium-configuration) type was recently formulated; it is a peculiar hybrid between toroidal and mirror traps. A typical characteristic of such a system is the longitudinal heterogeneity of the magnetic field. A longitudinal-nonhomogeneous, i.e., corrugated magnetic field is also characteristic for the projected INTOR tokamak. In connection with this, it is of interest to extend earlier results to systems with a longitudinal-nonhomogeneous magnetic field. The present paper can serve as a step in this direction. In it we obtain the Mercier stability criterion and the stability criterion of the g-mode for the said systems, with allowance for the effects quadratic with respect to plasma pressure.

32337 **(ORNL-tr—5127) Rotation of a tenuous plasma with high toroidal velocity in a tokamak.** Mikhailovskii, A.B. (Oak Ridge National Lab., TN (USA); Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1983. Contract AC05-84OR21400. Translation of IAEA—3716/7, 1983. 7p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012990.

The question of plasma rotation in a tokamak is of interest for problems of neoclassical transport and also for instability theory. In recent years, the original inferences of the neoclassical transport theory have been placed in doubt in some papers, for the reason that the influence of poloidal rotation of the plasma on the transport was not taken into account previously. Earlier, we considered the rotation problem in the Pfirsch-Schleuter regime and demonstrated that even with an essentially radial electric field the velocity of poloidal rotation cannot substantially exceed the drift-temperature velocity of the ions. It follows from this that there is no basis for reconsideration of the neoclassical transport theory in the said regime. Now we are examining the problem of plasma rotation in the plateau and banana regimes and demonstrating that the velocity of poloidal rotation in these regimes is also of the order of the drift-temperature velocity of the ions and thus is immaterial for transport problems.

32338 **(ORNL-tr—5129) Electron distribution function for electron-cyclotron heating in tokamaks.** Alikaev, V.V.; Vdovin, V.L.; Kurchatov, I.V. (Oak Ridge National Lab., TN (USA); Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1983. Contract AC05-84OR21400. Translation of IAEA—3726/7, 1983. 17p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012984.

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The electron distribution function (EDF) in the case of an inhomogeneous magnetic field of tokamaks is found. The nonsteady-state Fokker-Planck equation is used; it takes into account electron-ion and electron-electron collisions, the heat losses of the electrons, and the electron-wave interaction. The electron-electron collisions are treated by using the complete Fokker-Planck collision operator. No linearizations are carried out in the problem, which permits considering high levels of injected powers, i.e., nonlinear heating regimes. The relation of the current density to the specific RF power 1/P is determined by this method within a broad range of phase velocities, energy lifetime tau/sub E/, and level of specific power injected P.

32339 (ORNL-tr—5115) Measurement of continuous x-radiation and determination of the energy distribution function of high-energy electrons from an ECR plasma. Bernhardi, K. (Bochum Univ. (Germany, F.R.). Abt. fuer Physik und Astronomie). 1980. Contract AC05-84OR21400. Translation source information not available . 71p. NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012865.

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Investigations were made on the x-radiation emitted by a plasma. The methods applied here represent a further development of experimental and numerical methods used hitherto for determining the bremsstrahlung emitted by a plasma, and makes possible a more precise determination of the high-energy electron component of a plasma.

7002 Fusion Power Plant Technology

REFER ALSO TO CITATION(S) 31149, 31193, 31363, 31409, 31411, 32304

32340 (CONF-840476—1) Generic magnetic fusion reactor cost assessment. Sheffield, J. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 27p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84011582.

From Fusion Power Associates annual meeting and symposium on fusion power development --the next decade; Livermore, CA, USA (2 Apr 1984).

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A generic D-T burning magnetic fusion reactor model shows that within the constraints set by generic limitations it is possible for magnetic fusion to be a competitive source of electricity in the 21st century.

32341 (CONF-840614—50) Water-cooled liquid and solid breeder blanket concepts. Morgan, G.D.; Bowers, D.; Hellwig, T.; Ruester, D.; Sze, D.K.; Johnson, C.; Jung, J.; Liu, Y.Y.; Misra, B.; Gordon, J. (McDonnell Douglas Astronautics Co., St. Louis, MO (USA); Argonne National Lab., IL (USA); TRW, Inc., Redondo Beach, CA (USA)). 1984. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011745.

From Annual meeting of the American Nuclear Society; New Orleans, LA, USA (3 Jun 1984).

Four concepts have been evaluated: (1) lithium oxide breeder (Li_2O) with and without beryllium neutron multiplier (Li_2O/H_2O, $Li_2O/H_2O/Be$); (2) ternary oxide ceramic breeder (γ-$LiAlO_2$) with beryllium neutron multiplier ($LiAlO_2/H_2O/Be$); (3) γ-$LiAlO_2$ with lead neutron multiplier ($LiAlO_2/H_2O/Pb$); and (4) 17Li-83Pb breeder without a separate neutron multiplier ($LiPb/H_2O$). Candidate structural materials are austenitic stainless steel (PCA), ferritic steel (HT-9), and vanadium alloy (V-15Cr-5Ti). The pressurized water coolant is assumed to be at 280°C inlet, 320°C outlet, and 15.2 MPa design pressure.

32342 (CONF-840614—51) Decision analysis methodology for the blanket comparison and selection study. Piet, S.J.; Baker, C.C.; Waganer, L.M. (EG and G Idaho, Inc., Idaho Falls (USA); Argonne National Lab., IL (USA); McDonnell Douglas Astronautics Co., St. Louis, MO (USA)). 1984. Contract W-31-109-ENG-38. 4p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012091.

From Annual meeting of the American Nuclear Society; New Orleans, LA, USA (3 Jun 1984).

The decision analysis methodology has been a vital learning part of this selection study and represents a significant advance over the processes used in previous conceptual design studies. The identified factors in the four detailed evaluation areas have helped guide and focus the research efforts. The methodology should lead to the best possible final decisions whose basis will be clearer to the fusion community.

32343 (DOE/DP/40092—3) Measurements of high resolution spectra on the Omega laser at Rochester University. FY 82 annual report. Feldman, U. (Naval Research Lab., Washington, DC (USA). E.O. Hulburt Center for Space Research). 1984. Contract AI08-79DP40092. 5p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012419.

A very high resolution grazing incidence spectrograph and vacuum chamber were attached to the Omega laser facility of the Laboratory for Laser Energetics (LLE), at the University of Rochester. The 3 m (88°) grazing incidence grating spectrograph can be used with either of two Bausch and Lomb gold replica gratings. One of the gratings has 1200 lines mm^{-1} blazed at 2° 35′, and although its wavelength coverage extends to 385 A, the spectrograph is most efficient between 8 A and 130 A. The spectral resolution near 100 A obtained with this configuration is better than 0.03 A. The second grating has 600 lines mm^{-1} blazed at 6° 2′.

32344 (DOE/DP/40092—4) Measurements of spatially resolved high resolution spectra of laser-produced plasmas. FY 83 annual report. Feldman, U. (Hulbert (E.O.) Center for Space Research, Washington, DC (USA)). 1984. Contract AI08-79DP40092. 10p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012418.

A high resolution grazing incidence spectrograph, provided by the Naval Research Laboratory and the Goddard Space Flight Center, has been installed on the Omega laser facility of the Laboratory for Laser Energetics (LLE) at the University of Rochester. This 3 meter instrument, with a 1200 lines/mm grating blazed at 2° 35′, has produced extremely high quality spectra in the wavelength region 10 A to 100 A. Spectra have been obtained from glass microballoon targets that are coated with a variety of high-Z materials. Transitions from the Na-like and Ne-like ionization stages of Fe, Ni, Cu, and Kr have been identified.

32345 (DOE/DP/40092—5) Extreme ultraviolet spectra of highly ionized Ge, Kr and Mo emitted by imploding plasmas. Goldsmith, S.; Feldman, U.; Cohen, L.; Behring, W.E. (Maryland Univ., College Park (USA). Lab. for Plasma and Fusion Energy Studies; Naval Research Lab., Washington, DC (USA); National Aeronautics and Space Administration, Greenbelt, MD (USA). Goddard Space Flight Center). 1984. Contract AI08-79DP40092. 23p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84011752.

Spectra of highly ionized Ge, Kr and Mo in the spectral region of 10 to 80A were excited in laser-produced plasmas. The plasma was obtained by focusing the energy of the 24 laser beams of the University of Rochester Omega system on 0.4 mm diameter microballoon targets. The laser pulse duration was in the range of 0.87 to 1.09 ns, with total energy in the range of 1.8 to 2.2 kJ. The observed spectral lines include $n = 2$-2 transitions in the oxygen and fluorine isoelectronic sequences and $n = 3$ to 4 transitions in the sodium, magnesium and aluminum isoelectronic sequences. The present observations are compared with previous experimental and theoretical studies.

32346 (DOE/DP/40124—34) New model of Raman spectra in laser produced plasma. Simon, A.; Short, R.W. (Rochester Univ., NY (USA). Lab. for Laser Energetics). 30 Mar 1984. Contract AC08-80DP40124. 17p. (CONF-8405163—5). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012487.

From Anomalous absorption conference; Charlottesville, VA, USA (6 May 1984).

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Some experimental observations of Raman scattering in laser produced plasma have been previously attributed to the onset of the convective Stimulated Raman Instability (SRS-C). This interpretation has had a number of difficulties, associated with the calculated threshold for onset of the SRS-C, the existence of gaps in the frequency spectrum near the incident frequency ω_0 and near $\omega_0/2$, and with the angular distribution. We now propose a new explanation based on ordinary incoherent Thompson scattering, with a greatly enhanced plasma line. Transient local reversed-slope velocity distributions in the underdense region can be produced by pulses of hot electrons arising from the two-plasmon (2ω/sub p/) or abso-

lute stimulated Raman instabilities (SRS-A) occurring near the quarter critical surface. A simple model yields the observed spectral gaps near ω_0 and near $\omega_0/2$. It also explains the correlation of onset of this scattering with onset of the SRS-A, its transient localization in frequency and time, and the weak azimuthal angular variation. The existence of upscattered light is also predicted.

32347 **(DOE/DP/40124—37) How useful are odd-integer half-harmonics.** Seka, W.; Goldman, L.M.; Tanaka,K.; Afeyan, B.; Simon, A.; Short, R. (Rochester Univ., NY (USA). Lab. for Laser Energetics). 17 Feb 1984. Contract AC08-80DP40124. 21p. (CONF-8405163—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012392.

From Anomalous absorption conference; Charlottesville, VA, USA (6 May 1984).

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Odd-integer half-harmonic spectra from laser-produced plasmas have been reported since 1970. They have been clearly identified as related to parametric processes near n/sub c//4, most prominently the 2ω/sub p/ decay instability. In this paper we present arguments for the exercise of greater caution in the use of the 3ω/2 spectral splitting as a temperature diagnostic. We further discuss a model to explain the various features of the ω/2 spectra and we will show that one of its features is well suited as a temperature diagnostic. Furthermore, we will discuss fine structure observed in both the ω/2 and 3ω/2 spectra which appears to be related to secondary decay processes near n/sub c//4.

32348 **(DOE/DP/40135—1) Studies of CO_2 laser interactions with plasmas. Final technical report, 1 January 1981-30 March 1983.** Chen, F.F.; Joshi, C. (California Univ., Los Angeles (USA). Dept. of Electrical Engineering). Dec 1983. Contract AS08-81DP40135. 25p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012485.

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New results are reported on (1) Detection of ion waves in SBS by Thomson scattering, (2) Explanation of SBS saturation by ion trapping, (3) Interaction of SBS and SRC (theory), (4) Detection of SRS and explanation of threshold, (5) Excitation of plasma waves by optical mixing, (6) Use of Stark satellites as a new diagnostic, and (7) Observation of Rayleigh-Taylor instabilities in a theta pinch. Progress is reported on high-density experiments employing a solid target.

32349 **(DOE/DP/40185—1) Preliminary conceptual design of Siriu, A symmetric illumination, direct drive laser fusion reactor. Final report August 8, 1983-June 1, 1984.** Badger, B.; Attaya, H.A.; Bartel, T.J.; Corradini, M.L.; Engelstad, R.L.; Kulcinski, G.L.; Lovell, E.G.; Moses, G.A.; Peterson, R.R.; Sawan, M.E. (Wisconsin Univ., Madison (USA). Dept. of Nuclear Engineering; Rochester Univ., NY (USA). Lab. for Laser Energetics). Mar 1984. Contract AS08-83DP40185;AS08-83DP40186. 134p. (UWFDM—568). NTIS, PC A07/MF A01; 1; GPO Dep. Order Number DE84012907.

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A critical issues study of a symmetric illumination, direct drive laser fusion reactor called SIRIUS has been conducted. In particular, the uniformity requirements for direct drive targets have been assessed and it is shown that respectable gains (more than 60) could be obtained at modest (2MJ) KrF laser energies. Previous ICF cavity designs have been examined for use in a symmetric illumination geometry and features from several designs have been combined into a dry wall cavity design with a radius of 8 meters. Neutronic and photonic analysis shows that the present SIRIUS cavity design can breed sufficient tritium (breeding ratio = 1.17) even with 32 laser ports penetrating the cavity. However, it was found that there are a few critical issues that remain to be solved before a self-consistent reactor design could be initiated. Radiation damage to final optics, thermal performance of SiC tiles on the SIRIUS cavity wall, and performance of direct drive targets to nonuniformities in the beam are a few of the critical issues identified for future work.

32350 **(DOE/ER/03077—T1) Magnetohydrodynamic equilibrium and stability of stellarators.** Bauer, F.; Betancourt, O.; Garabedian, P. (New York Univ., NY (USA). Courant Inst. of Mathematical Sciences). 1984. Contract AC02-76ER03077. 201p. NTIS, PC A10/MF A01; 1; GPO Dep. Order Number DE84010731.

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A numerical method to study plasma confinement in a strong magnetic field is detailed. The emphasis is on confinement in toroidal geometry without two-dimensional symmetry. The mathematical model employed in the investigation is based on the partial differential equations of ideal magnetohydrodynamics. The principal application is to stellarators, currently important in the development of controlled thermonuclear fusion. The BETA computer code, along with a sample run, is included.

32351 **(DOE/ER/52061—2) START/TM: a study of start-up and fractional power operation of tandem mirror fusion reactors.** Conn, R.W.; Ghoniem, N.M.; Najmabadi, F. (eds.). (California Univ., Los Angeles (USA)). Jan 1984. Contract AT03-80ER52061. 409p. (UCLA/PPG—764). NTIS, PC A18/MF A01; 1; GPO Dep. Order Number DE84011477.

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Start-up, shutdown and fractional power operation are important parts of power reactor operation. Special requirements for operation during these phases often place design constraints on key subsystems and can influence the fundamental design approach. This report presents investigations of these problems for tandem mirror fusion reactors (TMR's) and is referred to as the START/TM study. As a basis for the work, the MARS conceptual tandem mirror reactor design is used as the general reactor model. An overall framework is developed for start-up and fractional power increases to full power, applicable to any fusion reactor. Five phases are identified that include initial commissioning, cold or hot shutdown, system testing and plasma initiation to a standby mode, staged power increases, and rated power operation. Both general and specific constraints associated with these phases are identified and a plasma shutdown scenario is developed.

32352 **(DOE/ET/53016—T3) Safety and deterministic failure analyses in high-beta D-D tokamak reactors.** Selcow, E.C. (Columbia Univ., New York (USA)). 1984. Contract AC02-76ET53016. 116p. (COO—2456/85). NTIS, PC A06/MF A01; GPO Dep. Order Number DE84012693.

Safety and deterministic failure analyses were performed to compare major component failure characteristics for different high-beta D-D tokamak reactors. The primary focus was on evaluating damage to the reactor facility. The analyses also considered potential hazards to the general public and operational personnel. Parametric designs of high-beta D-D tokamak reactors were developed, using WILDCAT as the reference. The size, and toroidal field strength were reduced, and the fusion power increased in an independent manner. These changes were expected to improve the economics of D-D tokamaks. Issues examined using these designs were radiation induced failurs, radiation safety, first wall failure from plasma disruptions, and toroidal field magnet coil failure.

32353 **(DOE/OR/21400—T7) Informal handbook for long-term exchangees in US-Japan cooperation program in fusion research.** Dresner, L. (Oak Ridge National Lab., TN (USA)). Dec 1983. Contract AC05-84OR21400. 50p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84010982.

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This informal handbook gives the experiences and impressions received by 4 US scientists upon their visits to Japan. (MOW)

32354 **(GTFR—44) Survey of the methods of MHD analysis of magnetic islands.** Morris, R.N. (Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering and Health Physics). Nov 1983. Contract AS05-78ET52025. 49p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84008858.

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This work explains the structure, the importance of, and the MHD analysis of tearing modes. The reduced MHD equations are shown to offer the ability to follow the time evolution of tearing modes, but at a high cost in computer resources. The quasilinear equations are shown to have the ability to model more complex geometric situations, but at the expense of the time dependence of the equations. The derivation of both methods are outlined.

32355 (INIS-SU—219, pp 3-11) **Design and technological peculiarities of the TM-4A installation.** Alekseev, A.G.; Bol'shakova, M.M.; Bondarchuk, Eh.N. (and others). 1982. (In Russian). NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780219. (CONF-8106209—Vol.2).

From 2. all-union conference on engineering problems of thermonuclear reactors; Leningrad, USSR (23 Jun 1981).

A small experimental thermonuclear installation TM-4A specially designed for foreign nuclear research centres is described. The TM-4A is a Tokamak device intended for studying physical processes in a high-temperature plasma with the maximum electron concentration of about $5X10^{13}$ cm^{-3}, electron temperature of 700 eV, ion temperature of about 250 eV. The TM-4A installation has the following specifications: 0.53 m large torus radius, 0.1 m discharge chamber radius, 120 kA max. plasma current, 0.015 s plasma confinement duration, 120 s interval between discharges, 4T longitudinal magnetic field strength, $1x10^{-5}$ Torr max. pressure in discharge chamber. The main systems of the device: electromagnetic and vacuum systems, gas exhaustion and injection complexes, power supplies for magnet coils, diagnostics, data acquisition, processing and storage systems are described in brief.

32356 (INIS-SU—219, pp 12-16) **Complex studies of mockups of electric insulators of cryoresistive coils of the T-15 device electromagnet system.** Aksenov, O.E.; Gringof, V.G.; Il'in, G.V.; Lapenas, A.A.; Stepanov, A.N.; Ulmanis, U.A. (Spetsial'noe Konstruktorskoe Byuro po sinteticheskoj Izolyatsii); Klimov, A.V.; Churakov, G.F. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1982. (In Russian). NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780219. (CONF-8106209—Vol.2).

From 2. all-union conference on engineering problems of thermonuclear reactors; Leningrad, USSR (23 Jun 1981).

The test results are presented for multilayer electrical insulation of coils in the T-15 thermonuclear device electromagnet system. The insulation is made ion the base of polyimide tape with adhesive coating. In the 77-93 K range the tape insulating strength is 35 MV/m, the dielectric loss tangent is less than 10^{-5}, dielectric permeability is 2.5, volume resistivity is more than 10^{6} Ohmxcm. The insulation has been tested for radiation effects in the IRT-2000 nuclear reactor. Different batches of insulation mockups 0.7 mm thick have been irradiated up to the integral fast neutron flux within the 10^{16}-$5x10^{18}$ neutr./cm^2 range (E >= 0.1 MeV), (J=10^{11}-10^{12} neutr./cm^2xs) at the corresponding temperature between 390 and 420 K. The given data on insulating strength point to a high radiation resistance of the multilayer polyimide insulation. To make sure finally that the developed insulation system meets the requirements of the operating conditions for thermonuclear device electromagnet system coils the device has been tested for operational life. On the basis of the test results a conclusion can be made that at the present development stage the multilayer polyimide insulation based on the adhesive tape meets to the utmost degree the requirements corresponding to the complicated operating conditions of the T-15 thermonuclear devices.

32357 (INIS-SU—219) **Reports of 2. All union conference on technological problems of thermonuclear reactors. Volume 2.** (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow; Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1982. 320p. (In Russian). (CONF-8106209—Vol.2). NTIS (US Sales Only), PC A14/MF A01. Order Number DE84780219.

From 2. all-union conference on engineering problems of thermonuclear reactors; Leningrad, USSR (23 Jun 1981).

Abstracts for each paper were included in the data base. (MOW)

32358 (LA-UR—84-1075) **High density Z pinch as a small low-energy fusion device.** Hammel, J.E.; Scudder, D.W.; Shlachter, J.S. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 8p. (CONF-8403100—3). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84009992.

From Conference of Z-pinches for fusion; Alexandria, VA, USA (29 Mar 1984).

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The Los Alamos HDZP experiment is investigating a Z pinch in the density range 0.5 x 10^{20} to 10^{21} cm^3. In the present experiments the pinch is created in 1 to 4 atmospheres of hydrogen on the axis of a cylindrical chamber through the combination of laser beam preionization and high electric-field breakdown between electrodes separated by 5 cm. The low-divergence laser beam focused by a 2 meter focal length lens enters the chamber through a .64 cm hole in the ground electrode and is dumped in a cavity in the high-voltage electrode. The pinch electrodes are driven by a 1.6 ohm, 600 kV water-transmission line switched to the load through a multipoint water breakdown switch. The line is charged by a 12 kJ, 600 kV Marx generator. The 30 ns neodymium laser pulse is fired 50 to 100 ns prior to the arrival of the high-voltage pulse. The 500 kV pulse gives an initial current-rise-rate of 4 x 10^{12} A/s and a peak current of 300 kA in 200 ns.

32359 (LA-UR—84-1413) **Operational performance of the Antares alignment system.** Bender, S.C.; Appert, Q.D. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 8p. (CONF-8404124—7). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012659.

From SPIE technical symposium; Arlington, VA, USA (29 Apr 1984).

A review of the operational performance of the alignment system for the large Antares optical system is presented. The alignment of twenty-four optical channels consisting of two hundred optical elements is verified and established as required prior to each target shot for this CO_2 laser fusion test facility. The overall system design included features such as automatic operation, data base driven controls, self calibration, provisions for initial optical alignment set up, and system aided fault location. The system approach employed two alignment stations which sequentially viewed the 24 optical channels (sectors) and could be used for prealignments and calibrations. Closed-loop operations via the computer permit rapid mirror alignments. The performance of the applied techniques and devices is evaluated and compared to the required performance specifically from the standpoint of accuracy and shot rate. Overall system performance with verification by actual target shots is presented.

32360 (LBL—16979) **Negative ion formation due to hydrogen plasma surface interaction.** Leung, K.N.; Ehlers, K.W. (Lawrence Berkeley Lab., CA (USA)). May 1984. Contract AC03-76SF00098. 13p. (CONF-840520—5). NTIS, PC A02/MF A01. Order Number DE84012259.

From 6. international conference on plasma surface interactions in controlled fusion devices; Nagoya, Japan (14 May 1984).

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Negative ions can be produced by a desorption process when energetic positive hydrogen ions impinge on the surface of reactor walls. The relative yield of different negative ions generated from various surface materials (such as Mo, Pt, Pd, Rh, Cu, Ta, Au, C, TiC and stainless-steel) have been compared in a multicusp plasma source. The negative ions generated are self-extracted from the source, and are identified by a mass spectrometer. The total negative ion current is measured by a Faraday cup.

32361 (LBL—17624) **Intense non-relativistic cesium ion beam.** Lampel, M.C. (Lawrence Berkeley Lab., CA (USA)). Feb 1984. Contract AC03-76SF00098. 141p. NTIS, PC A07/MF A01; GPO Dep. Order Number DE84012575.

Thesis.

The Heavy Ion Fusion group at Lawrence Berkeley Laboratory has constructed the One Ampere Cesium Injector as a proof of principle source to supply an induction linac with a high charge density and high brightness ion beam. This is studied here. An electron beam probe was developed as the major diagnostic tool for

characterizing ion beam space charge. Electron beam probe data inversion is accomplished with the EBEAM code and a parametrically adjusted model radial charge distribution. The longitudinal charge distribution was not derived, although it is possible to do so. The radial charge distribution that is derived reveals an unexpected halo of trapped electrons surrounding the ion beam. A charge fluid theory of the effect of finite electron temperature on the focusing of neutralized ion beams (Nucl. Fus. 21, 529 (1981)) is applied to the problem of the Cesium beam final focus at the end of the injector. It is shown that the theory's predictions and assumptions are consistent with the experimental data, and that it accounts for the observed ion beam radius of ~ 5 cm, and the electron halo, including the determination of an electron Debye length of ~ 10 cm.

32362 **(PIFR—1100) High pressure tokamak fuel injector. Phase II. Final report, December 1977-December 1979.** Knowles, J.L. (Physics International Co., San Leandro, CA (USA)). Jan 1980. Contract AC03-77ET52011. 83p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012402.

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Tokamak fusion reactors will require a method for replenishment of spent fuel when operated in a steady-state mode. To establish the fueling requirements, a device capable of delivering a 1-mm-diameter hydrogen pellet at 2 km/s every 10 minutes is desired. This effort was to design, fabricate and test an experimental high-pressure fuel injector capable of producing pulsed liquid hydrogen jets of 2 km/s and 0.6 mm diameter. A device was tested in which hydrogen initially at pressures of up to 2 kbar and temperatures down to 35°K, was expanded through a nozzle 0.65 mm in diameter and 46 mm long. Jet velocities were as predicted. The jets, injected into variable H_2 pressure atmospheres, exhibited spiral patterns. Insufficient precision in the hardware causing nonsymmetric flow to the nozzle inlet is believed to have produced the spiral jets.

32363 **(PPPL—2099) Physical processes in spin polarized plasmas.** Kulsrud, R.M.; Valeo, E.J.; Cowley, S. (Princeton Univ., NJ (USA). Plasma Physics Lab.). May 1984. Contract AC02-76CH03073. 79p. NTIS, PC A05/MF A01; GPO Dep. Order Number DE84013078.

If the plasma in a nuclear fusion reactor is polarized, the nuclear reactions are modified in such a way as to enhance the reactor performance. We calculate in detail the modification of these nuclear reactions by different modes of polarization of the nuclear fuel. We also consider in detail the various physical processes that can lead to depolarization and show that they are by and large slow enough that a high degree of polarization can be maintained.

32364 **(PPPL—2101) Lower hybrid wave resonance cone detection via CO_2 laser scattering.** Wurden, G.A.; Wong, K.L.; Ono, M. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Apr 1984. 66p. NTIS, PC A04/MF A01. Order Number DE84013098.

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Lower hybrid waves are studied in the Princeton ACT-I steady-state toroidal plasma device using a radially scanning CO_2 laser scattering system with both amplitude and phase sensitive detection techniques. Clearly defined resonance cones launched from external electrostatic antennas are seen to disappear as the plasma density is raised. Scaling of LHW laser signal with RF power in the presence of resonance cones shows nonlinearities associated with RF induced changes in the effective laser scattering volume. Absolute fluctuation level estimates suggest this occurs when e PHI/T/sub e/ ≧ 1. Wavefront curvature effects can cause a complete loss of resonance cone laser signals, even though probes indicate that cones are still present. Measurements of the wave k/sub perpendicular/-spectrum in the plasma show direct evidence for electron Landau filtering of the original wave k/sub parallel/-spectrum launched from the antenna at the plasma edge, and strong dependence on antenna phasing. Finally, frequency shifts and loss of the resonance cone signal are associated with high levels of plasma density edge turbulence.

32365 **(SAND—83-2614C) Characterization of impurities deposited on the PDX graphite rail limiter.** Doyle, B.L.; Wampler, W.R.; Dylla, H.F.; Owens, D.K.; Ulrickson, M.L. (Sandia National Labs., Albuquerque, NM (USA); Princeton Univ., NJ (USA). Plasma Physics Lab.). May 1984. Contract AC04-76DP00789. 16p. (CONF-840520—2). NTIS, PC AO2/MF A01; GPO Dep. Order Number DE84011684.

From 6. international conference on plasma surface interactions in controlled fusion devices; Nagoya, Japan (14 May 1984).

The surface contamination of a graphite rail limiter recently removed from the PDX tokamak has been characterized using ion-beam, electron-beam and x-ray analyses. The major impurities detected were Ti and Fe, with the Ti present in the form of a carbide. The distribution of these elements indicate that the erosion and deposition processes balance at a distance one cm from the apex of this limiter (the point of contact with the plasma) for Ti and at about two cm for Fe. The importance of TiC formation on the conditioning process is discussed.

32366 **(UCID—19874) Tritium-assisted fusion breeders.** Greenspan, E.; Miley, G.H. (Illinois Univ., Urbana (USA). Fusion Studies Lab.). Aug 1983. Contract W-7405-ENG-48. 94p. NTIS, PC A05/MF A01; 1; GPO Dep. Order Number DE84012142.

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This report undertakes a preliminary assessment of the prospects of tritium-assisted D-D fuel cycle fusion breeders. Two well documented fusion power reactor designs - the STARFIRE (D-T fuel cycle) and the WILDCAT (Cat-D fuel cycle) tokamaks - are converted into fusion breeders by replacing the fusion electric blankets with ^{233}U producing fission suppressed blankets; changing the Cat-D fuel cycle mode of operation by one of the several tritium-assisted D-D-based modes of operation considered; adjusting the reactor power level; and modifying the resulting plant cost to account for the design changes. Three sources of tritium are considered for assisting the D-D fuel cycle: tritium produced in the blankets from lithium or from ^3He and tritium produced in the client fission reactors. The D-D-based fusion breeders using tritium assistance are found to be the most promising economically, especially the Tritium Catalyzed Deuterium mode of operation in which the ^3He exhausted from the plasma is converted, by neutron capture in the blanket, into tritium which is in turn fed back to the plasma. The number of fission reactors of equal thermal power supported by Tritium Catalyzed Deuterium fusion breeders is about 50% higher than that of D-T fusion breeders, and the profitability is found to be slightly lower than that of the D-T fusion breeders.

32367 **(UCRL—15617) High field Nb_3Sn Axicell insert coils for the Mirror Fusion Test Facility-B (MFTF-B) axicell configuration. Final report.** Baldi, R.W.; Tatro, R.E.; Scanlan, R.M.; Agarwal, K.L.; Bailey, R.E.; Burgeson, J.E.; Kim, I.K.; Magnuson, G.D.; Mallett, B.D.; Pickering, J.L. (General Dynamics/Convair, San Diego, CA (USA)). Mar 1984. Contract W-7405-ENG-48. 272p. NTIS, PC A12/MF A01; 1; GPO Dep. Order Number DE84012685.

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Two 12-tesla superconducting insert coils are being designed by General Dynamics Convair Division for the axicell regions of MFTF-B for Lawrence Livermore National Laboratory. A major challenge of this project is to ensure that combined fabrication and operational strains induced in the conductor are within stringent limitations of the relatively brittle Nb_3Sn superconductor filaments. These coils are located in the axicell region of MFTF-B. They have a clear-bore diameter of 36.195cm (14.25 inches) and consist of 27 double pancakes (i.e., 54 pancakes per coil) would on an electrically insulated 304LN stainless steel/bobbin helium vessel. Each pancake has 57 turns separated by G-10CR insulation. The complete winding bundle has 4.6 million ampere-turns and uniform current density of 2007 A/cm^2. In conjunction with the other magnets in the system, they produce a 12-tesla central field and a 12.52-tesla peak field. A multifilamentary Nb_3Sn conductor was selected to meet these requirements. The conductor consists of a monolithic insert soldered into a copper stabilizer. Sufficient cross-sectional area and work-hardening of the copper stabilizer has been provided

for the conductor to self-react the electromagnetic Lorentz force induced hoop stresses with normal operational tensile strains less than 0.07 percent.

32368 **(UCRL—89204) Alternative power supply and dump resistor connections for similar, mutally coupled, superconducting coils.** Owen, E.W.; Shimer, D.W.; Wang, S.T. (Lawrence Livermore National Lab., CA (USA)). 30 Nov 1983. Contract W-7405-ENG-48. 6p. (CONF-831203—141). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012602.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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Alternative methods of connecting similar mutually coupled coils to their power supplies and dump resistors are investigated. The circuits are evaluated for both operating and fault conditions. The factors considered are the voltage to ground during a dump, short circuits, open circuits, quenches, and failure of the protection system to detect a quench. Of particular interest are the currents induced in coils that remain superconducting when one or more coils quench. The alternative connections include combined power supplies, individual dump resistors, combined resistors and series and parallel dump resistors. A new circuit that contains coupling resistors is proposed. The coupling resistors do not affect normal fast dumps but reduce the peak induced currents while also reducing the energy rating of the dump resistors. Another novel circuit, the series circuit with diodes, is discussed. The MFTF-B central-cell solenoids are used as an example.

32369 **(UCRL—89205) Switching transients in a superconducting coil.** Owen, E.W.; Shimer, D.W. (Lawrence Livermore National Lab., CA (USA)). 18 Nov 1983. Contract W-7405-ENG-48. 7p. (CONF-831203—156). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012592.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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A study is made of the transients caused by the fast dump of large superconducting coils. Theoretical analysis, computer simulation, and actual measurements are used. Theoretical analysis can only be applied to the simplest of models. In the computer simulations two models are used, one in which the coil is divided into ten segments and another in which a single coil is employed. The circuit breaker that interrupts the current to the power supply, causing a fast dump, is represented by a time and current dependent conductance. Actual measurements are limited to measurements made incidental to performance tests on the MFTF Yin-yang coils. It is found that the breaker opening time is the critical factor in determining the size and shape of the transient. Instantaneous opening of the breaker causes a lightly damped transient with large amplitude voltages to ground. Increasing the opening time causes the transient to become a monopulse of decreasing amplitude. The voltages at the external terminals are determined by the parameters of the external circuit. For fast opening times the frequency depends on the dump resistor inductance, the circuit capacitance, and the amplitude on the coil current. For slower openings the dump resistor inductance and the current determine the amplitude of the voltage to ground at the terminals. Voltages to ground are less in the interior of the coil, where transients related to the parameters of the coil itself are observed.

32370 **(UCRL—89206) Design lessons from using programmable controllers in the MFTF-B personnel safety and interlocks system.** Branum, J.D. (Lawrence Livermore National Lab., CA (USA)). 29 Nov 1983. Contract W-7405-ENG-48. 5p. (CONF-831203—148). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012596.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

Applying programmable controllers in critical applications such as personnel safety and interlocks systems requires special considerations in the design of both hardware and software. All modern programmable controller systems feature extensive internal diagnostic capabilities to protect against problems such as program memory errors; however most, if not all present designs lack an intrinsic capability for detecting and countering failures on the field-side of their I/O modules. Many of the most common styles of I/O modules can also introduce potentially dangerous sneak circuits, even without component failure. This paper presents the most significant lessons learned to date in the design of the MFTF-B Personnel Safety and Interlocks System, which utilizes two non-redundant programmable controllers with over 800 I/O points each. Specific problems recognized during the design process as well as those discovered during initial testing and operation are discussed along with their specific solutions in hardware and software.

32371 **(UCRL—89207) Improvement in MFTF data base system response times.** Lang, N.C.; Nelson, B.C. (Lawrence Livermore National Lab., CA (USA)). 28 Nov 1983. Contract W-7405-ENG-48. 4p. (CONF-831203—146). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012590.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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The Supervisory Control and Diagnostic System for the Mirror Fusion Test Facility (MFTF) has been designed as an event driven system. To this end we have designed a data base notification facility in which a task can request that it be loaded and started whenever an element in the data base is changed beyond some user defined range. Our initial implementation of the notify facility exhibited marginal response times whenever a data base table with a large number of outstanding notifies was written into. In this paper we discuss the sources of the slow response and describe in detail a new structure for the list of notifies which minimizes search time resulting in significantly faster response.

32372 **(UCRL—89220) New kind of user interface for controlling MFTF diagnostics.** Preckshot, G.G.; Saroyan, R.A.; Mead, J.E. (Lawrence Livermore National Lab., CA (USA)). 29 Nov 1983. Contract W-7405-ENG-48. 5p. (CONF-831203—143). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012604.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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The Mirror Fusion Test Facility (MFTF) at Lawrence Livermore National Laboratory is faced with the problem of controlling a multitude of plasma diagnostics instruments from a central, multiprocessor computer facility. A 16-bit microprocessor-based workstation allows each physicist entree into the central multiprocessor, which consists of nine Perkin-Elmer 32-bit minicomputers. The workstation provides the user interface to the larger system, with display graphics, windowing, and a physics notebook. Controlling a diagnostic is now equivalent to making entries into a traditional physics notebook.

32373 **(UCRL—89223) Computer model of the MFTF-B neutral beam Accel dc power supply.** Wilson, J.H. (Lawrence Livermore National Lab., CA (USA)). 30 Nov 1983. Contract W-7405-ENG-48. 7p. (CONF-831203—144). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012598.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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Using the SCEPTRE circuit modeling code, a computer model was developed for the MFTF Neutral Beam Power Supply System (NBPSS) Accel dc Power Supply (ADCPS). The ADCPS provides 90 kV, 88 A, to the Accel Modulator. Because of the complex behavior of the power supply, use of the computer model is necessary to adequately understand the power supply's behavior over a wide range of load conditions and faults. The model developed includes all the circuit components and parameters, and some of the stray values. The model has been well validated for transients with times on the order of milliseconds, and with one exception, for steady-state operation. When using a circuit modeling code for a system with a wide range of time constants, it can become impossible to obtain good solutions for all time ranges at once. The present model concentrates on the millisecond-range transients because the compensating capacitor bank tends to isolate the power supply from the load for faster transients. Attempts to include stray circuit elements with time constants in the microsecond and shorter range have had little success because of huge increases in comput-

ing time that result. The model has been successfully extended to include the accel modulator.

32374 **(UCRL—89267) Startup experience with the MFTF-B ECRH 100 kV dc power supply.** Bishop, S.R.; Goodman, R.A.; Wilson, J.H. (Lawrence Livermore National Lab., CA (USA)). 30 Nov 1983. Contract W-7405-ENG-48. 7p. (CONF-831203—153). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012600.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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One of the 24 Accel dc Power Supplies (ADCPS) originally intended for the Mirror Fusion Test Facility (MFTF-B) Neutral Beam Power Supply (NBPS) System has been converted to provide negative polarity output at 90 kV with a load current of 64 A dc. The load duty cycle is a pulse of 30-seconds duration with a pulse repetition period of five minutes. A new control system has been built which will serve as a prototype for the MFTF-B ADCPS controls, and a test setup was built which will be used to test the ADCPS. The Electron Cyclotron Resonance Heating (ECRH) dc Power Supply (DCPS) has been tested under both no-load and dummy-load conditions, under remote control, without notable problems. Test results indicate that the power supply should be reliable and safe to operate, and will meet the load duty requirements.

32375 **(UCRL—89268) Noise filtering algorithm for the MFTF-B computer based control system.** Minor, E.G. (Lawrence Livermore National Lab., CA (USA)). 30 Nov 1983. Contract W-7405-ENG-48. 6p. (CONF-831203—147). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012589.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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An algorithm to reduce the message traffic in the MFTF-B computer based control system is described. The algorithm filters analog inputs to the control system. Its purpose is to distinguish between changes in the inputs due to noise and changes due to significant variations in the quantity being monitored. Noise is rejected while significant changes are reported to the control system data base, thus keeping the data base updated with a minimum number of messages. The algorithm is memory efficient, requiring only four bytes of storage per analog channel, and computationally simple, requiring only subtraction and comparison. Quantitative analysis of the algorithm is presented for the case of additive Gaussian noise. It is shown that the algorithm is stable and tends toward the mean value of the monitored variable over a wide variety of additive noise distributions.

32376 **(UCRL—89281) Sparking protection for MFTF-B neutral beam power supplies.** Cummings, D.B. (Lawrence Livermore National Lab., CA (USA)). 30 Nov 1983. Contract W-7405-ENG-48. 6p. (CONF-831203—154). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012597.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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This paper describes the upgrade of MFTF-B Neutral Beam Power Supplies for sparking protection. High performance ion sources spark repeatedly so ion source power supplies must be insensitive to sparking. The hot deck houses the series tetrode, arc and filament supplies, and controls. Hot deck shielding has been upgraded and a continuous shield around the arc, filament, gradient grid, and control cables now extends from the hot deck, through the core snubber, to the source. The shield carries accelerating current and connects only to the source. Shielded source cables go through an outer duct which now connects to a ground plane under the hot deck. This hybrid transmission line is a low inductance path for sparks discharging the stray capacitance of the hot deck and isolation transformers, reducing coupling to building steel. Parallel dc current return cables inside the duct lower inductance to reduce inductive turn-off transients. MOVs to ground further limit surges in the remote power supply return. Single point grounding is at the source. No control or rectifier components have been damaged nor are there any known malfunctions due to sparking up to 80 kV output.

32377 **(UCRL—89282) Stand alone computer system to aid the development of Mirror Fusion Test Facility rf heating systems.** Thomas, R.A. (Lawrence Livermore National Lab., CA (USA)). 1 Dec 1983. Contract W-7405-ENG-48. 7p. (CONF-831203—152). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012588.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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The Mirror Fusion Test Facility (MFTF-B) control system architecture requires the Supervisory Control and Diagnostic System (SCDS) to communicate with a LSI-11 Local Control Computer (LCC) that in turn communicates via a fiber optic link to CAMAC based control hardware located near the machine. In many cases, the control hardware is very complex and requires a sizable development effort prior to being integrated into the overall MFTF-B system. One such effort was the development of the Electron Cyclotron Resonance Heating (ECRH) system. It became clear that a stand alone computer system was needed to simulate the functions of SCDS. This paper describes the hardware and software necessary to implement the SCDS Simulation Computer (SSC). It consists of a Digital Equipment Corporation (DEC) LSI-11 computer and a Winchester/Floppy disk operating under the DEC RT-11 operating system. All application software for MFTF-B is programmed in PASCAL, which allowed us to adapt procedures originally written for SCDS to the SSC. This nearly identical software interface means that software written during the equipment development will be useful to the SCDS programmers in the integration phase.

32378 **(UCRL—89403) Overview of the data acquisition and control system for plasma diagnostics on MFTF-B.** Wyman, R.H.; Deadrick, F.J.; Lau, N.H.; Nelson, B.C.; Preckshot, G.G.; Throop, A.L. (Lawrence Livermore National Lab., CA (USA)). 18 Nov 1983. Contract W-7405-ENG-48. 7p. (CONF-831203—155). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012595.

From 10. symposium on fusion engineering; Philadelphia, PA, USA (5 Dec 1983).

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For MFTF-B, the plasma diagnostics system is expected to grow from a collection of 12 types of diagnostic instruments, initially producing about 1 Megabyte of data per shot, to an expanded set of 22 diagnostics producing about 8 Megabytes of data per shot. To control these diagnostics and acquire and process the data, a system design has been developed which uses an architecture similar to the supervisory/local-control computer system which is used to control other MFTF-B subsystems. This paper presents an overview of the hardware and software that will control and acquire data from the plasma diagnostics system. Data flow paths from the instruments, through processing, and into final archived storage will be described. A discussion of anticipated data rates, including anticipated software overhead at various points of the system, is included, along with the identification of possible bottlenecks. A methodology for processing of the data is described, along with the approach to handle the planned growth in the diagnostic system. Motivations are presented for various design choices which have been made.

32379 **(UCRL—90161) DT-burning upgrade to MFTF-B.** Thomassen, K.I.; Logan, B.G.; Doggett, J.N.; Coensgen, F.H. (Lawrence Livermore National Lab., CA (USA)). 7 May 1984. Contract W-7405-ENG-48. 26p. (CONF-840520—6). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012612.

From 6. international conference on plasma surface interactions in controlled fusion devices; Nagoya, Japan (14 May 1984).

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To improve MFTF-B, one must raise the ion energy and the electrostatic confining potential. This requires higher beam energy (200 keV in this case) and, to preserve end-plug adiabaticity and hold higher plasma density in the central cell, a higher level of magnetic field. In the MFTF Upgrade we also want to incorporate the new end plug configuration first invented for the MARS reactor. This new magnet design is compared with the present MFTF-B magnet set. The differences include the addition of a pair of recircularizing coils on the ends to be used in conjunction with the

end region pumping and direct converter schemes, the use of a yin-yang pair rather than a baseball-type coil in the transition, and the elimination of the axicell in favor of the simple choke coil. Also, as noted earlier, an axisymmetric mirror cell is imbedded in the central cell.

32380 **(UCRL—90334) Soft x-ray laser experiments at Novette Laser Facility.** Matthews, D.; Hagelstein, P.; Rosen, M.; Kauffman, R.; Lee, R.; Wang, C.; Medecki, H.; Campbell, M.; Ceglio, N.; Leipelt, G. (Lawrence Livermore National Lab., CA (USA); KMS Fusion, Inc., Ann Arbor, MI (USA)). 05 Mar 1984. Contract W-7405-ENG-48. 22p. (CONF-840387—8). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012594.

From 2. topical meeting on laser techniques in the extreme ultraviolet; Boulder, CO, USA (5 Mar 1984).

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We discuss the results of and future plans for experiments to study the possibility of producing an x-ray laser. The schemes we have investigated are all pumped by the Novette Laser, operated at short pulse (tau/sub L/ $\sim$ 100 psec) and an incident wavelength of λ /sub L/ $\sim$ 0.53 μm. We have studied the possibility of lasing at 53.6, 68.0 to 72.0, 119.0, and 153.0 eV, using the inversion methods of resonant photo-excitation, collisional excitation, and three-body recombination.

32381 **(UCRL—90335) Diagnostics for an XUV/soft x-ray laser.** Kauffman, R.L.; Matthews, D.L.; Ceglio, N.; Medecki, H. (Lawrence Livermore National Lab., CA (USA)). 03 Mar 1984. Contract W-7405-ENG-48. 9p. (CONF-840387—9). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012593.

From 2. topical meeting on laser techniques in the extreme ultraviolet; Boulder, CO, USA (5 Mar 1984).

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We have begun investigating the production of an XUV/soft x-ray laser, using our high-powered glass lasers as drivers. A major diagnostic for lasing is the measure of the absolute power produced in the lasing line. I have developed a spectrograph to time-resolved lasing lines in the energy range from 50 eV to greater than 200 eV. the spectrograph combines a transmission grating and x-ray streak camera to produce a flat field instrument. A cylindrical mirror is used in front of the grating to image the source and act as a collecting optic. The efficiency of the components is calibrated so that absolute intensities can be measured. I will compare the performance of this instrument with reflection grating systems. I will also discuss planned improvements to the system which should increase total throughput, image quality, and resolving power.

32382 **(UCRL—90758) Economic potential of inertial fusion.** Nuckolls, J.H. (Lawrence Livermore National Lab., CA (USA)). Apr 1984. Contract W-7405-ENG-48. 49p. (CONF-840476—2). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012739.

From Fusion Power Associates annual meeting and symposium on fusion power development --the next decade; Livermore, CA, USA (2 Apr 1984).

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Beyond the achievement of scientific feasibility, the key question for fusion energy is: does it have the economic potential to be significantly cheaper than fission and coal energy. If fusion has this high economic potential then there are compelling commercial and geopolitical incentives to accelerate the pace of the fusion program in the near term, and to install a global fusion energy system in the long term. Without this high economic potential, fusion's success depends on the failure of all alternatives, and there is no real incentive to accelerate the program. If my conjectures on the economic potential of inertial fusion are approximately correct, then inertial fusion energy's ultimate costs may be only half to two-thirds those of advanced fission and coal energy systems. Relative cost escalation is not assumed and could increase this advantage. Both magnetic and inertial approaches to fusion potentially have a two-fold economic advantage which derives from two fundamental properties: negligible fuel costs and high quality energy which makes possible more efficient generation of electricity. The wining approach to fusion may excel in three areas: electrical generating efficiency, minimum material costs, and adaptability to manufacture in automated factories. The winning approach must also rate highly in environmental potential, safety, availability factor, lifetime, small O and M costs, and no possibility of utility-disabling accidents.

32383 (SAND—84-0169-Vol.8-No.1, pp 24-32) **Hydrogen effects in fusion reactor walls.** May 1984. NTIS, PC A03/MF A01. Order Number TI84012270. Contract AC04-76DP00789.

In Sandia technology. Vol. 8, No. 1.

Hydrogen isotopes escape from magnetically confined fusion plasmas and iteract with materials in reactor walls - a crucial problem in fusion reactors. Our studies of these interactions lead to predictive models for reactor-wall design.

32384 **Collisional end loss of electrostatically confined particles in a magnetic mirror field.** Najmabadi, F.; Conn, R.W. (California Univ., Los Angeles (USA). School of Engineering and Applied Science); Cohen, R.H. (California Univ., Livermore (USA). Lawrence Livermore National Lab.). *Nuclear Fusion;* **24**: No. 1, 75-84(Jan 1984).

The basic problem of collisional end loss of electrostatically confined particles in a magnetic mirror field with a multi-species background plasma is considered. An analytical procedure similar to, but more accurate than, that of Pastukhov is employed. Using the method of images, in the limit of large mirror ratio and modest confining potential, a class of approximate solutions, set containing Fsub(a), to the corresponding linearized Fokker-Planck equation is found, which is characterized by some adjustable parameters. These parameters are then chosen so that the surface Fsub(a)=0 approximately matches the true loss boundary. An analytical estimate of the error in the loss rate due to this matching procedure is made. A new expression for the loss rate is developed and compared with the results from Fokker-Planck codes, and remarkable agreement over a wide range of mirror ratios and confining potentials is found.

32385 **(ORNL-tr—5118) Calculation of ballistic focusing of ion beams.** Astrelin, V.T.; Syresin, E.M. (Oak Ridge National Lab., TN (USA); AN SSSR, Novosibirsk. Inst. Yadernoj Fiziki). 1984. Contract AC05-84OR21400. Translation of Preprint 83-41. 21p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012870.

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The motion of ions passing from the homogeneous magnetic field into a conical one is treated analytically in paraxial approximation. Further ions transform into neutral particles at the recharging target which is placed in the conical area of field. The optimal conditions for maximum compression of the beams of neutral particles are investigated. An influence of the initial angular spread on the beam compression is analysed. The computation results together with the those of analytical treatment are presented.

32386 **Application of catastrophe theory to a point model for bumpy torus with neoclassical non-resonant electrons.** Punjabi, A.; Vahala, G. (College of William and Mary, Williamsburg, VA (USA). Dept. of Physics). *Journal of Plasma Physics;* **30**: 389-421(Dec 1983).

The point model for the toroidal core plasma in the ELMO Bumpy Torus (with neoclassical non-resonant electrons) is examined in the light of catastrophe theory. Even though the point model equations do not constitute a gradient dynamic system, the equilibrium surfaces are similar to those of the canonical cusp catastrophe. The point model is then extended to incorporate ion cyclotron resonance heating. A detailed parametric study of the equilibria is presented. Further, the nonlinear time evolution of these equilibria is studied, and it is observed that the point model obeys the delay convention (and hence hysteresis) and shows catastrophes at the fold edges of the equilibrium surfaces. Tentative applications are made to experimental results.

32387 **Ion sources for plasma filled ion diodes.** Vandevender, J.P.; Hoffman, J.M.; Mills, G.S.; Mendel, E.W. (Sandia National Labs., Albuquerque, NM (USA)). *Comments on Plasma Physics and Controlled Fusion;* **7**: No. 6, 207-214(May 1983).

Inertial confinement fusion with intense particle beam drivers may be possible with one or more megajoules of ion beam energy at power densities as low as 20 TW/cm² on target. However, the targets are less risky and are simpler with higher power density drivers at the same energy. The AMPFION, plasma filled ion diode offers the possibility of providing a 200 TW/cm² driver given a suitable plasma ion source. The plasma requirements and the performance of a new carbon plasma source are described. In addition, a concept for producing an improved Li^+ ion source through the resonant absorption of laser light is discussed.

32388 **Strong ion coupling effects at high density of inertial confinement fusion plasmas.** Golden, K.I. (Northeastern Univ., Boston, MA (USA). Dept. of Electrical Engineering). *Laser and Particle Beams;* 1: 3-9(Feb 1983).

Strong ion coupling could play an important role in laser - and particle beam - compressed ICF layered targets. Some light is shed on these effects by examining structure and pair correlation functions calculated from some of the well known strongly coupled plasma approximation schemes.

32389 **Theoretical and experimental progress in tokamak plasma confinement.** Sigmar, D.J. (Oak Ridge National Lab., TN (USA)). pp 18-57 of Information meeting. Current aspects of fusion research. Vienna, Austria; Verlag der Oesterreichischen Akademie der Wissenschaften (1983). (In German)(CONF-8303153—).

From Current aspects of fusion engineering information meeting; Vienna, Austria (3 Mar 1983).

A review is given in six chapters on current trends and achievments of tokamak research in USA. 1. Introduction 2. A recapitulation of the tokamak principle. 3. New records for beta; a new operational mode (H-mode) in Divertor plasmas. 4. Dependence of achievable poloidal βsub(E) as well as of the energy confinement time tau sub(E) on the heating power as resulting from a) tangential neutral particle heating in the ISX-B tokamak, b) normal neutral particle heating in the TDX tokamak. 5. Report on direct current drive through Lower Hybrid Resonance radio frequency in Alcator C and in PLT. 6. First operation of TFTR D-T experiment in Princeton.

32390 **(ORNL-tr—5126) Pulsed high-current source of negatively charged hydrogen ions.** Bel'chenko, Yu.I.; Dimov, G.I. (Oak Ridge National Lab., TN (USA); AN SSSR, Novosibirsk). 1983. Contract AC05-84OR21400. Translation of Preprint No. 83-109. 20p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012989.

A high current cellular source (HCCS) is described. The high-current glow discharge of the HCCS with open electron drift is localized in the extended gap between the emitting surface of the cathode and the anode cover with emission apertures. Operational parameters of the H^- source are described.

99 GENERAL AND MISCELLANEOUS

32391 **(DOE/RG/10347—T3) Annotated archive of communication references: empirical and theoretical works.** Crano, W.D.; Ludwig, S.; Selnow, G.W. (eds.). (Michigan State Univ., East Lansing (USA). Center for Evaluation and Assessment). Jun 1981. Contract AC01-80RG10347. 297p. NTIS, PC A13/MF A01; 1; GPO Dep. Order Number DE84012146.

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The Archive is the most recent compilation of the prolific research and writings on all aspects of the communication process. In addition to the references compiled in previous bibliographies, this archive contains citations of more recently published empirical and theoretical work.

9901 Management

32392 **(ANAEM-FR—82) Progress report 1982.** (Ankara Nuclear Research and Training Center (Turkey)). 1982. 205p. (In Turkish, English). NTIS (US Sales Only), PC A10/MF A01. Order Number DE84701750.

Presented are the research works carried out in 1982 in Physics, Chemistry, Nuclear Agriculture, Health Physics, Electronics Division and Nuclear Information Group of Ankara Nuclear Research and Training Center.

32393 **(BLG—558) Annual report 1982.** (Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)). 1982. 247p. NTIS (US Sales Only), PC A11/MF A01. Order Number DE84701751.

This report of the Centre d'Etude de l'Energie Nucleaire - Studiecentrum voor Kernenergie gives a survey of the scientific and technical work done in 1982. The research areas are: 1. The sodium-cooled fast reactor and namely the mixed oxide fuels, the carbide fuel, the materials development, the reprocessing, the fast reactor physics, the safety and instrumentation and the sodium technology. 2. The gas-cooled reactors as gas cooled fast and high temperature reactors. 3. The light water reactors, namely the BR3 reactor, the light water reactor fuels and the plutonium recycling. 4. The applied nuclear research, waste conditioning and disposal as the safeguards, the fusion research and the lithium technology. 5. The basis and exploratory research namely the materials science and the nuclear physics and finally 6. Non-nuclear research and development such as the air pollution, the pollution abatement and waste handling, the fuel cells and applied electrochemistry.

32394 **(DOE/IG—0008/6) Semiannual report - 1st half FY 1984, October 1, 1983-March 31, 1984.** Richards, J.R. (Department of Energy, Washington, DC (USA). Office of Inspector General). 31 May 1984. 56p. TIC, PO Bx 62, Oak Ridge, TN 37831. Order Number TI84012394.

The Office of Inspector General has made steady progress during this reporting period in fulfilling its mandate to prevent and detect fraud and abuse and to promote efficiency and economy in the Department of Energy's (DOE) programs and operations. The Office of Audits issued four public reports and 71 other reports which primarily resulted from our reviews of departmental contracts. Based on our report recommendations, DOE managers have made commitments to more effectively use over $8 million. An additional $6.3 million of contractor costs that were questioned in audit reports were recovered by the Department during the six months ending March 31, 1984. The Office of Inspections issued 13 reports during the first half of Fiscal Year 1984. Issues addressed ranged from an evaluation of the Department's capability to conduct an emergency drawdown of crude oil inventories at the Strategic Petroleum Reserve Bryan Mound site to critical issues raised by concerned citizens relative to the Department's policies on the control of radioactive waste. In addition, the Office of Inspections continued to monitor a 1982 report wherein we questioned the estimated cost of construction for Phase I of the Defense Waste Processing Facility at Aiken, South Carolina. After a recommended review of the estimates was made, the Department's Acquisition Executive made a decision supporting the reduction of the estimated cost of the facility from $910 million to $870 million. During this reporting period, 11 Office of Investigations cases were referred to prosecutive authorities and other investigative agencies. One of the cases was accepted for prosecution. During the reporting period we had 30 indictments and 29 convictions. We also recovered $38,804. Three hundred twenty-six cases remained open on March 31, 1984.

32395 **(DOE/TIC—3398-Suppl.1) DOE patents available for licensing. A bibliography for the period 1966-1974. Supplement 1.** Thoeming, G.H. (Department of Energy, Oak Ridge, TN (USA). Technical Information Center). Oct 1983. 63p. NTIS, $9.25. Order Number DE83017340.

Abstracts and indexes are provided for 510 DOE patents or patent applications concerning any aspect of energy production, conservation, and utilization. The entries are arranged by subject category as shown in the table of contents. The bibliography covers the period from 1966 through 1974.

32396 **(EGG-M—01284) Practical writing and editing techniques.** Hallinan, E.J. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 5p. (CONF-840497—12). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012642.

From 31. international technical communication conference; Seattle, WA, USA (29 Apr 1984).

Technical writing and editing involve more than a knowledge of style and format. Often a draft must be prepared from existing documents and edited for content as well as style. A practical approach to writing and editing tasks includes increasing writer/editor exposure with cognizant personnel, researching source and legal documents, participating in project meetings, and reviewing the document by checking for inconsistencies and selectively questioning the contents. This approach will help the writer/editor prepare a reasonably accurate, politically acceptable document with a minimum of supervision.

32397 **(EGG-M—01784) Terminal oversight: the editor and the word processor.** Garber, R. (EG and G Idaho, Inc., Idaho Falls (USA)). 1984. Contract AC07-76ID01570. 7p. (CONF-840497—11). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012648.

From 31. international technical communication conference; Seattle, WA, USA (29 Apr 1984).

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The many editorial and administrative functions unique to a technical editor are evaluated relative to word processors. Editing functions are categorized into five major units, each linked to an administrative task.

32398 (INIS-mf—8927, pp 29-35) **Building of new Institute for Research, Production and Application of Radioisotopes in Prague 10.** Chorvat, K. 1981. (In Russian). NTIS (US Sales Only), PC A05/MF A01. Order Number TI84780240.

In 60 years of the Institute for Research, Production and Application of Radioisotopes 1919-1979.

Project construction is described of the new building of the Institute in Prague-Malesice. Data on some of the buildings, their purpose and layout are given.

32399 **(RISO-R—491) Physics Department annual progress report 1 January - 31 December 1982.** (Risoe National Lab., Roskilde (Denmark)). Sep 1983. 73p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE84701752.

Research in the Physics Department at Risoe National Laboratory covers three main fields: condensed matter physics, plasma physics and meteorology. The report is a progress report describing the principal activities in these fields for the period from 1 January to 31 December 1982. The condensed matter physics research is predominantly experimental utilising diffraction of neutrons, X-rays, and synchrotron X-ray radiation. The research topics range from studies of structure, excitations and phase transitions in model systems to studies of ion transport, texture and recrystallization kinetics with a more applied nature. The plasma physics research is partly experimental and partly theoretical. A study of pellet-plasma interaction is of applied nature and aimed at assessing the possibilities of refuelling a fusion reactor by shooting deuterium-tritium pellets into the plasma. A study of the fundamental physics of plasmas deals with investigations of wave propagation properties, instabilities, solitons, turbulence, etc. The research and applied work within meteorology lies within micrometereology and the subjects range from surface energy balance studies, over studies of the general structure of atmospheric coherence and boundary layer response to change in surface elevation, to specific studies of turbulent dispersion and deposition of airborne material. As part of the applied work within meteorology and wind energy, the test station for small windmills tests and licences windmills for the Danish market and offers consulting assistance for the Danish windmill manufacturers.

32400 **(ZfI-Mitt—67) Reports of the Central Institute for Isotopes and Radiation Research.** (Akademie der Wissenschaften der DDR, Leipzig. Zentralinstitut fuer Isotopen- und Strahlenforschung). May 1983. 80p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE84780375.

Selected papers have been processed for inclusion in the Energy Data Base.

32401 **Marketing: winning proposals for government work.** Balsmeyer, D.L.; Joehnk, P.J.; Butler, R.O. (Mound Facility, Miamisburg, OH). *Architectural Record;* vp(Aug 1982).

While many architects and engineers are all too familiar with the procedures for getting government work, many more will wade in without an understanding of the highly detailed route from their identification of such projects to their actually being selected for them. This article represents the expriences and practices in a typical situation for government research installations in which a private corporation, Monsanto, operates the Mound Facility in Ohio for the Department of Energy. Beyond day-to-day operations, the corporation secures architectural and engineering services for new construction, and must follow Federal guidelines in doing so. Are all government procedures for acquiring such services alike? Except in the few "showcase" projects for which competitions are now often held, the answer is yes. And the emphasis is on experience and technical proficiency - not design ability.

9902 Mathematics And Computers

REFER ALSO TO CITATION(S) 30244, 31376, 31377, 31407, 31431

32402 **(AD-A—136868/7) European scientific notes. Volume 38. Number 1. Monthly publication.** Shaffer, L.E. (Office of Naval Research (USA). London Branch Office). Jan 1984. 70p. (ESN—38-1). NTIS, PC A04/MF A01.

See also Volume 37, Number 12, AD-A135883.

Topics include: Gender-mixed Crews on Dutch Combat Ships; Max-Planck-Institute for Psycholinguistics; Cancer Therapy with Magnetism; 9th European Underwater Biomedical Society Convention; International Center for Genetic Engineering and Biotechnology; Biotechnological Route to Polyphenylene; 2nd Romania-US Seminar on Polymer Chemistry; Statistical Climatology; A Code for Generating Dynamic Models of Robots; Fifth Generation Computing Systems; New Data Logger; Erosion by Liquid and Solid Impact, ELSI VI; Physical Chemistry of the Solid State -- Metals and alloys; NATO Buys a New Oceanographic Research Vessel; Oceanexpo/Oceantropigues 1984; Progress in Development of Wave Energy to Generate Electricity; IAPSO Symposia and Oceanography at the 18th IUGG; New Decision Support System; High Energy Channeling Research in Switzerland; Muon-Catalyzed Fusion; 2nd International Symposium on Acoustic Remote Sensing of the Atmosphere and Ocean; and Support of Science Research by the British Military.

32403 **(ANL—84-29) Design philosophy for reliable systems, including control.** Gabriel, J.R. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 18p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012681.

In the past, use of computers and software to manage physical plant has usually involved systems similar to the clockwork automata of the 17th century. The next generation of plant control will include intelligent systems - computer systems having knowledge of the plant and being capable of intelligent behavior, even though only some control functions will need such expertise. This report develops a framework for a universe of discourse usable by such non-human experts. It is based on the idea that a design has many features of a contract and may be described as a contract between humans and a machine, defining what each must do to attain a goal. Several points are discussed: the use of techniques in analytical redundancy and their place as analogues in administrative control for conventional techniques in physical control; the use of redundant computer systems to protect against hardware faults; the necessity to prove properties of software used in redundant hard-

ware, because software faults are common modes across redundant hardware; and some issues in choosing a programming language for provable control software. Because proof of correctness is costly, it should be used only where necessary. This report concludes that the degree of reliability needed by the plant model used in analytic redundancy protection need not be nearly as reliable as the mechanism to detect discrepancy between plant and model.

32404 **(ANL/TM—335-Rev.) Guide to Graphics at ANL. Rev.** Bertrand, R.M.; Hack, B.R.; Malon, D.M. (Argonne National Lab., IL (USA)). Apr 1984. Contract W-31-109-ENG-38. 182p. NTIS, PC A09/MF A01; 1; GPO Dep. Order Number DE84013189.

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Guide to Graphics at ANL is a general reference guide to doing graphics at Argonne. It should be used along with documents which describe the use of specific graphics software or operating systems. Guide to Graphics at ANL describes the current graphics environment at Argonne National Laboratory, including the hardware, the software, and the procedures needed to write and run programs that produce graphics at Argonne. While the majority of the material presented documents production of graphics on the central IBM computers, production of graphics on divisional VAX computers is also discussed. However, no attempt is made to cover in detail the hardware and software available on the divisional VAX computers. 48 references, 19 figures, 15 tables.

32405 **(BARC—1179) Microprocessor based dual bus structured data acquisition and processing system : DAPS-80.** Pethe, V.A.; Patankar, A.M.; Ram, L.S.; Bayala, A.K.; Ghodgaonkar, M.D. (Bhabha Atomic Research Centre, Bombay (India)). 1983. 22p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701744.

The microprocessor based dual bus structured data acquisition and processing system has been designed around Intel 8080 microprocessor. The system is described and operational results are given.

32406 **(CONF-8405171—1) Local area networks: applications in the Instrumentation and Controls Division at Oak Ridge National Laboratory.** Prater, D.G. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 30p. NTIS, PC A03/MF A01; GPO Dep. Order Number DE84012324.

From 13. midyear meeting of the American Society for Information Science; Bloomington, IN, USA (20 May 1984).

The use of a local area network requires some knowledge of how computers are connected together and an understanding of computer terminology, standards, equipment, and strengths and weaknesses. The intent here is to provide a brief background regarding these subjects and to describe specific applications in the Instrumentation and Controls Division at Oak Ridge National Laboratory (ORNL).

32407 **(CONF-8405173—1) Workshop on transaction processing/reporting.** Smith, M.I.; Amburgey, J.D. (Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 49p. NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012334.

From Mark IV users group meeting; New York, NY, USA (1 May 1984).

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This manual teaches efficient operation of the Informatics General Mark IV's transaction processing. Examples are given. (GHT)

32408 **(CONF-8405175—1) Raster scan algorithm for generating hidden isoparametric surfaces.** Akin, J.E.; Montgomery, J.; Gray, W.H. (Rice Univ., Houston, TX (USA); Oak Ridge National Lab., TN (USA)). 1984. Contract AC05-84OR21400. 16p. NTIS, PC A02; 3; GPO Dep. Order Number DE84012323.

From Mathematics finite element and applications conference; London, UK (2 May 1984).

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Finite element analyses and computer aided design systems must often present graphical representations of three-dimensional isoparametric surfaces. Various algorithms have been developed to describe color surfaces and to determine visibility. A procedure for using isoparametric interpolation to define such surfaces is presented. It is an extension of an earlier algorithm for defining contour lines. When applied on a raster scan color graphics device (or a line printer) the procedure allows the true representation of isoparametric surfaces. Surfaces can be presented in different colors. The intersection of surfaces is automatically included in the procedure for determining visibility. The algorithm can also be easily extended to allow color contour shading of the surfaces to values.

32409 **(EGG-M—06084) Fortran 8x: the scientific programming language of the future.** Marshall, N.H. (EG and G Idaho, Inc., Idaho Falls (USA)). 13 Apr 1984. Contract AC07-76ID01570. 34p. (CONF-8404165—1). NTIS, PC A03/MF A01; 1; GPO Dep. Order Number DE84012526.

From FORTRAN forum; Geneva, Switzerland (13 Apr 1984).

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The draft standard is known as Fortran 8x because it is anticipated that it will be completed in the 1980's, but the exact year is not yet known. There have been many changes proposed for Fortran 8x, and many of them will seem like a radical change for Fortran, but all of them are functions which have been tried before. The final language will partly bridge the gap between Fortran 77 and languages such as Pascal, PL/1, Algol 68, Modula and Ada while retaining Fortran's unique advantages. Despite the extent of the revision, there will be few totally new and untried features added. What is described may seem radical to programmers using the present standard unless they have also tried the newer languages.

32410 (IAEA-TECDOC—280, pp 93-108) **Distributed intelligence versus central laboratory.** Halling, H. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Zentrallabor fuer Elektronik). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

After a discussion of the main tasks in a nuclear laboratory like overall experiment planning, sample production and management, performance of experiments, data processing and report generation the essential disadvantages of centralised systems are shown and the proper measures for overcoming those by distribution are discussed. Finally possible shortcomings due to improper design and management of distributed architectures are shown.

32411 **(IC—82/178) Identification of necessary and sufficient conditions for real non-negativeness of rational matrices.** Saeed, K. (International Centre for Theoretical Physics, Trieste (Italy)). Dec 1982. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701746.

The necessary and sufficient conditions for real non-negativeness of rational matrices have been identified. A programmable algorithm is developed and is given with its computer flow chart. This algorithm can be used as a general solution to test the real non-negativeness of rational matrices. The computer program assures the feasibility of the suggested algorithm.

32412 **(IC—83/37) Distortions in frequency spectra of signals associated with sampling-pulse shapes.** Njau, E.C. (International Centre for Theoretical Physics, Trieste (Italy)). Apr 1983. 26p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE84701747.

A method developed earlier by the author [IC/82/44; IC/82/45] is used to investigate distortions introduced into frequency spectra of signals by the shapes of the sampling pulses involved. Conditions are established under which the use of trapezoid or exponentially-edged pulses to digitize signals can make the frequency spectra of the resultant data samples devoid of the main features of the signals. This observation does not, however, apply in any way to cosinusoidally-edged pulses or to pulses with cosine-squared edges. Since parts of the Earth's surface and atmosphere receive

direct solar energy in discrete samples (i.e. only from sunrise to sunset) we have extended the technique and attempted to develop a theory that explains the observed solar terrestrial relationships. A very good agreement is obtained between the theory and previous long-term and short-term observations.

32413 **(JINR—5-83-244) Data evaluation efficiency on the base of a nonuniform sample.** Dorogov, V.I.; Chistyakov, V.P.; Pokrovskij, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1983. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701749.

The comparative analysis of the efficiency of different methods used for determining the estimates of parameters obtained as a result of experimental data processing in the presence of incomplete or rough a priori information is made. The asymptotic dispersion of various estimates obtained by the methods of sample mean, sample median, sample truncation as well as by the Huber method and the method of maximum-likelihood fit are compared for a nonuniform sample. The effect of bias spread on the asymptotic dispersions is also estimated for the case when data processing is made without taking into account this bias. The conclusion is drawn that the best results are obtained by the method of sample truncation and by the Huber method.

32414 **(JINR—R-10-83-77) Eigenfunctions of angular scanning via charge-coupled device-matrix.** Soroko, L.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1983. 9p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE84701748.

The angular scanning algorithm for images created by a light sensitive charge-coupled devices (CCD) is described. The angular scanning algorithm is based on the eigenfunctions of angular scanning which are associated with discrete Walsh functions arranged according to the increasing of sequency. The index of memory cell into which the contents of image matrix cell goes is determined by the fact whether the component of discrete Walsh function is changing its sign or not. It is shown that the angular scanning algorithm offers high noise stability. The angular scanning algorithm can be used for production of the angular distribution of straight line tracks issuing from the common appex, the realization of this algorithm being inside the stage of image read-out by CCD-matrix. The revue of properties of Walsh-transform of images and the Walsh-masks for straight line tracks is presented.

32415 **(LA-UR—83-3085) Prolonging the life of software.** Connell, J.; Brice, L. (Los Alamos National Lab., NM (USA)). 1984. Contract W-7405-ENG-36. 30p. (CONF-840710—1). NTIS, PC A03/MF A01. Order Number DE84001722.

From National computer conference; Las Vegas, NV, USA (1 Jul 1984).

Presented here are methods for successfully controlling software maintenance activity so that present systems will be more useful and less expensive to support. While it is based on experience at Los Alamos National Laboratory, it is not based on solutions developed and implemented there. Los Alamos is presently struggling with the problems identified in this paper and is impacted by them to the same extent as the rest of industry. An idea has emerged from this struggle: the deterioration of production software is basically a quality control problem which can and should be solved. Many data processing shops currently have two options concerning old (over five years), marginally useful systems; pay the high cost of supporting them or undertake a rewrite. If the principles presented in this paper are applied, a third option may become available; prolonging the useful life of software by making it more cost-effective to support.

32416 **(LA-UR—84-1574) Sensitive dependence to parameters, fat fractals, and universal strange attractors.** Farmer, J.D. (Los Alamos National Lab., NM (USA)). May 1984. Contract W-7405-ENG-36. 10p. (CONF-840385—2). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012440.

From 15. lunar and planetary science conference; Houston, TX, USA (12 Mar 1984).

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There are many nonlinear differential equations for which two different types of behavior, such as chaos and periodicity, are interwoven in a complex and intricate manner, so that the bifurcation parameters form a fat fractal. The result is that statistical averages vary wildly with parameters and, strictly speaking, prediction becomes impossible even in the statistical sense. (For example, climate, as well as weather, is unpredictable). There is, however, order in this unpredictable behavior, which can be described by a universal strange attractor of the renormalization transformation.

32417 **(NBS/FIPS/PUB—60-2) I/O channel interface.** (International Business Machines Corp., Armonk, NY (USA)). 29 Jul 1983. 106p. NTIS, PC A06/MF A01. Order Number TI84900961.

This standard defines the functional, electrical, and mechanical interface specifications for connecting computer peripheral equipment as a part of automatic data processing (ADP) systems. This standard, together with a companion standard for power control, defines the hardware characteristics for the I/O channel level interface. In order to achieve full plug-to-plug interchangeability of peripheral components, device class specific operational specifications standards are also required for each class of peripheral device. The Government's intent in employing this I/O Channel Interface standard is to reduce the cost of satisfying the Government's data processing requirements through increasing its available alternative sources of supply for computer system components at the time of initial system acquisition, as well as in system replacement and augmentation and in system component replacement. This standard is also expected to lead to improved reutilization of system components. When acquiring ADP systems and system components, Federal agencies shall cite this standard in specifying the interface for connecting computer peripheral equipment as a part of ADP systems.

32418 **(SAND—84-0293) Smoother interpolant for DE/STEP, INTRP and DEABM: II.** Watts, H.A. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 23p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012915.

This report presents an improved smoother interpolant for the Adams family of ODE methods. A correction to the STEP code is given which eliminates an error that occurred under certain circumstances in forming the higher order coefficients for the method. Listings and details are provided for implementing the interpolation algorithm in the DE/STEP, INTRP suite of codes, and its descendant DEABM.

32419 **(SAND—84-0448) Boolean computation of optimum hitting sets.** Hulme, B.L.; Baca, L.S.; Shiver, A.W.; Worrell, R.B. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1984. Contract AC04-76DP00789. 13p. NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012920.

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This report presents the results of computational experience in solving weighted hitting set problems by Boolean algebraic methods. The feasible solutions are obtained by Boolean formula manipulations, and the optimum solutions are obtained by comparing the weight sums of the feasible solutions. Both the algebra and the optimization can be accomplished using the SETS language. One application is to physical protection problems. 8 references, 2 tables.

32420 **(SLAC-PUB—3332) 3081/E processor.** Kunz, P.F.; Gravina, M.; Oxoby, G.; Rankin, P.; Trang, Q.; Ferran, P.M.; Fucci, A.; Hinton, R.; Jacobs, D.; Martin, B. (Stanford Linear Accelerator Center, CA (USA); European Organization for Nuclear Research, Geneva (Switzerland)). Apr 1984. Contract AC03-76SF00515. 7p. (CONF-8405162—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012513.

From Symposium on recent developments in computing, processor, and software research for high-energy physics; Guanajuato, Mexico (8 May 1984).

The 3081/E project was formed to prepare a much improved IBM mainframe emulator for the future. Its design is based on a large amount of experience in using the 168/E processor to increase available CPU power in both online and offline environments. The processor will be at least equal to the execution speed of a 370/168 and up to 1.5 times faster for heavy floating point code. A single processor will thus be at least four times more powerful than the VAX 11/780, and five processors on a system would equal at least the performance of the IBM 3081K. With its large memory space and simple but flexible high speed interface, the 3081/E is well suited for the online and offline needs of high energy physics in the future.

32421 **(UCID—19592-Rev.1) DYNA3D user's manual (nonlinear dynamic analysis of solids in three dimensions).** Hallquist, J.O. (Lawrence Livermore National Lab., CA (USA)). Apr 1984. Contract W-7405-ENG-48. 109p. NTIS, PC A06/MF A01; 1; GPO Dep. Order Number DE84012828.

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This report provides an updated user's manual for DYNA3D, an explicit three-dimensional finite element code for analyzing the large deformation dynamic response of inelastic solids. A contact-impact algorithm permits gaps and sliding along material interfaces. By a specialization of this algorithm, such interfaces can be rigidly tied to admit variable zoning without the need of transition regions. Spatial discretization is achieved by the use of 8-node solid elements, and the equations-of-motion are integrated by the central difference method. DYNA3D contains fifteen material models and nine equations of state to cover a wide range of material behavior.

32422 **(UCRL—51744) Some technical considerations in the determination of probability-of-failure confidence contours.** Corynen, G.C. (Lawrence Livermore National Lab., CA (USA)). 29 Jan 1975. Contract W-7405-ENG-48. 9p. NTIS, PC A02/MF A01; GPO Dep. Order Number DE84013486.

A method is presented to obtain a confidence contour for the proportion F/sub X/(x) of a set of systems OMEGA which fail at or below an arbitrary environmental stress level x. Here F/sub X/ is the cumulative distribution function (CDF) of a random variable X on OMEGA whose mean μ and variance σ^2 are unknown, and X(omega) is the failure level (threshold) of system omega epsilon OMEGA. It is assumed that X is normal (Gaussian), and that a random sample of size N is available. The sample size N is thus included explicitly in the expressions for the confidence contour, and its influence upon the quality of the contour can be readily established.

32423 **(UCRL—89934) Computer graphics distortion of IMAX and OMNIMAX projection.** Max, N.L. (Lawrence Livermore National Lab., CA (USA)). 19 Oct 1983. Contract W-7405-ENG-48. 24p. (CONF-831281—1). NTIS, PC A02/MF A01; 1; GPO Dep. Order Number DE84012606.

From Nicograph conference; Tokyo, Japan (1 Dec 1983).

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This paper presents methods of compensating for the distortion of the UMNIMAX projection lens, so that computer animation may be prepared for viewing in a tilted dome OMNIMAX theater.

32424 **(UCRL—90777) AI/Simulation Fusion Project at Lawrence Livermore National Laboratory.** Erickson, S.A. (Lawrence Livermore National Lab., CA (USA)). 25 Apr 1984. Contract W-7405-ENG-48. 63p. (CONF-8405178—1). NTIS, PC A04/MF A01; 1; GPO Dep. Order Number DE84012609.

From Operations Research Society of America national meeting; San Francisco, CA, USA (16 May 1984).

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This presentation first discusses the motivation for the AI Simulation Fusion project. After discussing very briefly what expert systems are in general, what object oriented languages are in general, and some observed features of typical combat simulations, it discusses why putting together artificial intelligence and combat simulation makes sense. We then talk about the first demonstration goal for this fusion project.

32425 **An interactive parallel processor for data analysis.** Mong, J.; Logan, D.; Maples, C.; Rathbun, W.; Weaver, D. (Lawrence Berkeley Laboratory, University of California, Berkeley, CA 94720). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 162-166(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

A parallel array of eight minicomputers has been assembled in an attempt to deal with kiloparameter data events. By exporting computer system functions to a separate processor, the authors have been able to achieve computer amplification linearly proportional to the number of executing processors.

32426 **Local area networks: A matter of choice.** St. Amand, J.V. (Interlan, Inc. 3 Lyberty Way Westford, MA 01886). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **31**: No. 1, 811-817(Feb 1984). (CONF-831015—).

From Nuclear science symposium; San Francisco, CA, USA (19 Oct 1983).

Several new data communications/information management networks, specifically designed for use in a local domain, are commercially available "off-the-shelf". Known collectively as Local Area Networks (LANs), the networks span the spectrum of possible implementations. Developed in the absence of national and international standards in this domain, the networks are--with one exception -- based on closed systems. The Ethernet specification, originally due to the Xerox Corporation, is publicly available and has emerged as an open and de facto standard. Four classes of LANs are identified with emphasis on the multi-purpose LAN. Multi-purpose LANs range in linear coverage from hundreds to thousands of meters and support a variety of applications. Multi-purpose LANs, by virture of their limited inear coverage, are able to exploit new and emerging technologies thereby optimizing their effectiveness in their domain of applicability. Future implementations of international standards will reduce the cost of the multi-purpose LAN and further the cause of multi-vendor compatibility.

32427 **Discrete C^1 interpolant for tetrahedral data.** Alfeld, P. *Rocky Mountain Journal of Mathematics;* **14**: No. 1, 5-16(Jan 1984). Contract AC02-82ER12046.

We assume an underlying three-dimensional domain that has been tesselated into tetrahedra. A piecwise rational scheme is described that interpolates to function and gradient values at the vortices of the tetrahedra. No other data are required. The scheme is local and has quadratic precision. Its construction is described and numerical examples are given.

32428 **Transfinite C^2 interpolant over triangles.** Alfeld, P.; Barnhill, R.E. *Rocky Mountain Journal of Mathematics;* **14**: No. 1, 17-76(Jan 1984). Contract AC02-82ER12046.

A transfinite C^2 interpolant on a general triangle is created. The required data are essentially C^2, no compatibility conditions arise, and the precision set includes all polynomials of degree less than or equal to eight. The symbol manipulation language REDUCE is used to derive the scheme. The scheme is discretized to two different finite dimensional C^2 interpolants in an appendix.

32429 **Three- and four-dimensional surfaces.** Barnhill, R.E.; Little, F.F. *Rocky Mountain Journal of Mathematics;* **14**: No. 1, 77-102(Jan 1984). Contract AC02-82ER12046.

The representation and approximation of three- and four-dimensional surfaces is accomplished by means of local, piecewise defined, smooth interpolation methods. In order to interpolate to arbitrarily located data, the schemes are defined on geometric domains of triangles or tetrahedra, respectively.

32430 Multistage trivariate surfaces. Barnhill, R.E.; Stead, S.E. *Rocky Mountain Journal of Mathematics;* **14**: No. 1, 103-222(Jan 1984). Contract AC02-82ER12046.

We construct four-dimensional surfaces that approximate arbitrarily placed information. The basis strategy is (1) interpolate to the arbitrarily placed data with a general method, (2) then evaluate this general method over a coarse rectilinear grid to provide data for a tensor product method, and (3) render the surface by evaluating the tensor product over a finte grid. Graphical illustrations are also included.

32431 Triangle-based C^1 interpolation method. Renka, R.J.; Cline, A.K. *Rocky Mountain Journal of Mathematics;* **14**: No. 1, 223-264(Jan 1984).

This paper discusses methods and software for C^1 interpolation at arbitrarily distributed data points in the plane. The primary results presented here are derivative-estimation procedures which lead to interpolatory surfaces constituting very accurate approximations for a variety of test functions.

32432 Estimation of gradients from scattered data. Stead, S.E. *Rocky Mountain Journal of Mathematics;* **14**: No. 1, 265-299(Jan 1984). Contract AC02-82ER12046.

Many techniques for producing a surface from scattered data require gradients at the data points. Since only positional data are usually known, the gradients must be estimated before the surface can be computed. The quality of the surface depends on the estimated gradients; so it is important to compute accurate estimates.

32433 Inaccuracies in the calculation of standard deviation with electronic calculators. Wanek, P.M.; Whipple, R.E.; Fickies, T.E.; Grant, P.M. (Los Alamos National Lab., NM). *Analytical Chemistry;* **54**: 1877-1878(1982).

The problems arising with data sets consisting of tightly bunched arrays and severe calculation round-off errors when electronic calculators are used to calculate standard deviation of data are discussed. A simple remedy to the problem is set forth briefly.

9903 Information Handling

REFER ALSO TO CITATION(S) 31002, 31003, 32397

32434 (AECL—7700) CRNL library serials list. Serial holdings in the main library. Alburger, T.P. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Apr 1982. 228p. NTIS (US Sales Only), PC A11/MF A01. Order Number DE84701910.

A list of 1900 serial publications (periodicals, society transactions and proceedings, annuals and directories, indexes, newspapers, etc.) is presented with volumes and years held by the Main Library. This library is the largest in AECL as well as one of the largest scientific and technical libraries in North America, and functions as a Canadian resource for nuclear information. A main alphabetical list is followed by broad subject field lists representing research interests, and lists of abstract and index serials, general bibliographic serials, conference indexes, press releases, English translations, and original language journals.

32435 (DOE/TIC—4629) DOE Energy Data Base: input magnetic tape description. Busse, A.E. (ed.). (Department of Energy, Oak Ridge, TN (USA). Technical Information Center). Jun 1982. 18p. NTIS, PC A02/MF A01. Order Number DE82013735.

This document describes the format the inputting bibliographic citations, abstracts, and subject content indicators for energy information on computer readable magnetic tape to be incorporated into the DOE data base. This base is used by TIC to generate multiple publications and to support information retrieval activities. Information, or data, pertinent to one bibliographic reference will be called an entry. The entries are logically composed of data elements (such as title, authors, etc.).

32436 (IAEA-TECDOC—280, pp 109-132) Local area networks for distributed intelligent systems. Klessmann, H. (Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

A local area network is a data communication system allowing a number of independent devices to communicate with each other over a moderate-sized region. Local area networks are intended for supporting a wide variety of applications and various data devices. After an enumeration of the primary characteristics of current local area networks, data transmission in ring networks (empty-slot ring, token ring) and bus networks (contention bus, e.g. ETHERNET, token bus) is discussed in some detail, along with a comparison of baseband and broadband transmission. The ISO Open System Interconnection with its seven-layered structure is described, and efforts to create standards for local area networks are recounted.

32437 (IAEA-TECDOC—280, pp 173-182) Software for nuclear data acquisition systems. Christensen, P. (Risoe National Lab., Roskilde (Denmark)). Jan 1983. NTIS (US Sales Only), PC A14/MF A01. Order Number TI84780374. (CONF-8209219—).

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

The situation for experimenters and system designers needing software for instrumentation is described. It is stated that software for a data acquisition system can be divided into programmes described as the foundation software, the applications programme, and the analysis programme. Special attention is given to CAMAC. Two examples from Risoe describing data transportation and archiving are given. Finally the supply of software and the problems of documentation are described.

32438 (IAEA-TECDOC—280) Data acquisition and analysis systems for nuclear research and applications. Current status and trends. Proceedings of an advisory group meeting organized by the IAEA and held in Vienna, Austria, 13-17 September 1982. (International Atomic Energy Agency, Vienna (Austria)). Jan 1983. 319p. (CONF-8209219—). NTIS (US Sales Only), PC A14/MF A01. Order Number DE84780374.

From Advisory group meeting on data acquisition systems in nuclear science and technology; Vienna, Austria (13 Sep 1982).

Selected papers have been processed for inclusion in the Energy Data Base.

32439 (NBS/FIPS/PUB—104) Guideline for implementation of ANSI codes for the representation of names of countries, dependencies, and areas of special sovereignty. (National Bureau of Standards, Washington, DC (USA)). 19 Sep 1983. 32p. NTIS, PC A03/MF A01. Order Number TI84900966.

This Guideline implements ANSI Z39.27, Structure for the Representation of Names of Countries of the World for Information Interchange, of the American National Standards Institute (ANSI). ANSI Z39.27 adopts, with qualifications, the entities, names, and codes prescribed by ISO 3166, Codes for the Representation of Names of Countries, a standard of the International Organization for Standardization (ISO). The qualifications provide for complete coverage of the land areas of the world without overlap or duplication, and for entity names that, to the maximum extent possible, are approved or accepted by the United States Board on Geographic Names. Both two and three-character alphabetic codes are provided for each entity adopted from ISO 3166. The two-character codes are provided for general use and are recommended by ISO for international interchange. The three-character codes are available for special applications when their use would provide a particular advantage.

32440 **(SAND—84-1063C) Technology transfer revisited.** Traeger, R.K. (Sandia National Labs., Albuquerque, NM (USA)). May 1984. Contract AC04-76DP00789. 11p. (CONF-8405184—1). NTIS, PC A02/MF A01; GPO Dep. Order Number DE84012233.

From Meridian technology transfer conference; Washington, DC, USA (30 May 1984).

Technology transfer occurs continuously because individual researchers are enthused about their work. Recent concerns about the effectiveness of tech transfer, however, have developed a misconception on both the need for and effectiveness of transfer processes. Research, especially fundamental or mission-oriented research, may be successful in solving a national problem but have no industrial application. The majority of the technology transferred is through many people, takes many routes, and usually requires 5 to 10 years to become incorporated; that transfer is invisible. Technology transfer is alive and effective, and should continue to be encouraged. However, transfer has to be done at the individual researcher level. Funds spent on tech transfer offices and studies could be more effectively spent on the research itself. 11 references, 6 tables.

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In the Corporate Index, report literature is indexed using the name of the organization or institution responsible for issuing the report. Headings are provided for all report literature and for published literature for which a corporate approach is especially desirable, e.g., symposium and conference proceedings.

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H-Coal Pilot Plant. Volume I. 1.0 - executive summary and general project description, 2.0 - general reference section. Final report, 9:30104 (R;US)
H-Coal Pilot Plant. Volume II. 3.0 - pilot plant operations. Final report, 9:30105 (R;US)
H-Coal Pilot Plant. Volume III. 4.0 - equipment performance: 4.1 - test program, 4.2 - slurry pumps, 4.3 - H-Coal reactor, 4.4 - heaters. Final report, 9:30106 (R;US)
H-Coal Pilot Plant. Volume IV. 4.0 - equipment performance: 4.5 - heat exchangers, 4.6 - towers, 4.7 - storage tanks, 4.8 - drums and separators. Final report, 9:30107 (R;US)
H-Coal Pilot Plant. Volume V. 4.0 - equipment performance: 4.9 - solids separation, 4.10 - block valves, 4.11 - control valves. Final report, 9:30108 (R;US)
H-Coal Pilot Plant. Volume VI. 4.0 - equipment performance: 4.12 - pressure safety valves, 4.13 - instrumentation, 4.14 - process piping systems, 4.15 - hydrogen compressors. Final report, 9:30109 (R;US)
H-Coal Pilot Plant. Volume VIII. 6.0 - environmental, 7.0 - health and safety. Final report, 9:30111 (R;US)

Atmospheric Sciences Research Center, Albany, NY (USA)
High yield wind energy resources in the mid-Hudson River basin. Final report, 9:30594 (R;US)

Atomic Energy Control Board, Ottawa, Ontario (Canada)
Approach to the exemption of materials from regulation as radioactive wastes, 9:30391 (R;CA)
Place of human-factors in the work of the Atomic Energy Control Board, 9:30874 (R;CA)
Regulatory process for uranium mines in Canada -general overview and radiation health and safety in uranium mine-mill facilities, 9:30390 (R;CA)

Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.
Automated controlled-potential coulometric determination of uranium, 9:31276 (R;CA)
CRNL library serials list. Serial holdings in the main library, 9:32434 (R;CA)
Follow-up of AECL employees involved in the decontamination of NRU in 1958, 9:31750 (R;CA)
Follow-up of CRNL employees involved in the NRX reactor clean-up, 9:31749 (R;CA)
High-speed data acquisition system to measure low-level current from self-powered flux detectors in CANDU nuclear reactors, 9:30754 (R;CA)
Hydrogen production methods. A critical assessment, 9:30432 (R;CA)
Magnetic field measurements on the Chalk River superconducting cyclotron, 9:31486 (R;CA)
Multivariable control in nuclear power stations. Optimal control, 9:30822 (R;CA)
Multivariable controller for a 600 MWe CANDU nuclear power plant, 9:30823 (R;CA;In French)
Neutron and x-ray scattering studies of ferroelectric phase transitions, 9:31143 (R;CA)
Progress report: Chemistry and Materials Division, 1982 January 1 to March 31, 9:31330 (R;CA)
QA success stories, 9:30996 (R;CA)
Radiation chemistry of water at low dose rates with emphasis on the energy balance. A computer study, 9:31331 (R;CA)
Two high range survey meters for measuring γ and β dose rates, 9:31528 (R;CA)

Auburn Univ., AL (USA). Dept. of Chemical Engineering
Solvent tailoring in coal liquefaction. Quarterly report, January 1984-March 1984, 9:30134 (R;US)
Studies in coal liquefaction with application to the SRC and related processes. Report for the period August-September 1983, 9:30114 (R;US)

Avco-Everett Research Lab., Inc., Everett, MA (USA)
MHD generator component development. Quarterly report, October 1983-December 1983, 9:31044 (R;US)

B

Babcock and Wilcox Co., Alliance, OH (USA). Research and Development Div.
Role of chemical additives in transporting and depositing corrosive impurities in steam. Final report, 9:30648 (R;US)
Vessel V-7 and V-8 repair and characterization of insert material. Final report, 9:30813 (R;US)

B and M Technological Services, Inc., Boston, MA (USA)
Technical assistance to support U.S. Department of Energy to review applications received under the NECPA Title III Grants Program, 9:31060 (R;US)

Barker (William G.) and Associates, Arlington, TX (USA)
Transportation energy contingency planning: taxi and school bus use in Dallas-Fort Worth, 9:31075 (R;US)

Battelle Columbus Labs., OH (USA)
Analysis of lead-acid battery deep-cycle accelerated testing data, 9:30982 (R;US)
Wear measurements of nuclear power plant components. Final report, 9:30698 (R;US)
Workshop proceedings: planning and assessment of load management, 9:31035 (R;US)
Battelle Human Affairs Research Center, Seattle, WA (USA)
Simulator fidelity and training effectiveness: a comprehensive bibliography with selected annotations, 9:30692 (R;US)
Bayreuth Univ. (Germany, F.R.). Rechts- und Wirtschaftswissenschaftliche Fakultaet
Site selection of nuclear power plants, 9:30845 (R;DE;In German)
BDM Corp., Albuquerque, NM (USA)
McClellan PV system installation provides key lessons, 9:30523 (R;US)
Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations
National Uranium Resource Evaluation stream-sediment, hydrogeochemical, and aeromagnetic data characteristics of the Piedmont Region, eastern United States: a data release, 9:30279 (R;US)
Beschleunigerlaboratorium der Univ. und Technischen Univ. Muenchen, Garching (Germany, F.R.)
Annual report 1982 of the Beschleunigerlaboratorium of Univ. and Technische Univ. Muenchen, 9:32063 (R;DE)
Bhabha Atomic Research Centre, Bombay (India)
Analytical methods for the determination of boron in reactor materials programme, 9:31278 (R;IN)
Comparative study of parameters used in design and operation of desalination experimental facility versus the process parameters in a commercial desalination plant, 9:30610 (R;IN)
Experiences in ultrasonic correlation flow measuring technique, 9:31414 (R;IN)
Heavy ion elastic scattering code : OPTHI, 9:32157 (R;IN)
Hot vacuum outgassing to ensure low hydrogen content in MOX fuel pellets for thermal reactors, 9:30289 (R;IN)
Linear steady heat transfer analysis by boundary element method, 9:32265 (R;IN)
Microprocessor based dual bus structured data acquisition and processing system : DAPS-80, 9:32405 (R;IN)
Radiological Protection Dosimetry Section report of work done and list of publications during 1981-1982, 9:31751 (R;IN)
Spectrophotometric determination of zirconium with arsenazo-III after extraction with thenoyl tri fluoroacetone, 9:31277 (R;IN)
Bielefeld Univ. (Germany, F.R.). Zentrum fuer Interdisziplinaere Forschung
Factoriality of representations of the group of paths on SU(n), 9:32052 (R;DE)
Perturbative QED in terms of gauge invariant fields, 9:32053 (R;DE)
Some remarks on the asymptotic behaviour of solutions to nonlinear Schroedinger equations, 9:32273 (R;DE)
Time decay for the solutions of some nonlinear Schroedinger equations, 9:32272 (R;DE)
Bochum Univ. (Germany, F.R.). Abt. fuer Chemie
Investigations of the behavior of Fischer-Tropsch-catalysts in synthesis, 9:30469 (R;DE;In German)
Investigations on the reaction kinetics for the methanation of carbon monoxide, 9:30468 (R;DE;In German)
Synthesis of hydrocarbons by conversion of methanol on zeolite-catalysts of the ZSM 5 type, 9:30466 (R;DE;In German)
Bochum Univ. (Germany, F.R.). Abt. fuer Physik und Astronomie
Measurement of continuous x-radiation and determination of the energy distribution function of high-energy electrons from an ECR plasma, 9:32339 (TG;US)
Boeing Engineering and Construction Co., Seattle, WA (USA)
Cost comparisons for on-site spent-fuel storage options. Final report, 9:30300 (R;US)
Bonneville Power Administration, Portland, OR (USA)
Commissioning tests of the Bonneville Power Administration 30 MJ superconducting magnetic energy storage unit, 9:30649 (R;US)
Bonn Univ. (Germany, F.R.). Physikalisches Inst.
Particle ratios at high transverse momentum in pp collisions at $\sqrt{s}$ = 63 GeV and correlations between high p/sub T/ identified charged particles and associated identified charged particles, 9:31980 (R;US)
British Columbia Univ., Vancouver (Canada)
Application of the muonium spin rotation technique to a study of the gas phase chemical kinetics of muonium reaction with the halogens and hydrogen halides, 9:31873 (R;CA)
British Columbia Univ., Vancouver (Canada). Dept. of Metallurgical Engineering
Steel castings by the electroslag casting technique, 9:31145 (R;US)
British Columbia Univ., Vancouver (Canada). TRIUMF Facility
Studies for a TRIUMF Kaon Factory, 9:31480 (R;CA)
British Government, London
1983 No. 919. The Nuclear Installations (Prescribed Sites) Regulations 1983, 9:30876 (R;GB)
Energy Act 1983, 9:30875 (R;GB)
British Nuclear Fuels Ltd., Risley
Proof of evidence [BNFL 2]. Sizewell 'B' power station public inquiry, 9:30713 (R;GB)
Brookhaven National Lab., Upton, NY (USA)
Bolting applications, 9:30811 (R;US)
Bolting applications, 9:30691 (R;US)
Case study of the Blouin superinsulated house, 9:31053 (R;US)
Characterization of the products and comparison of the product yields from the flash pyrolysis of fir wood in hydrogen and helium, 9:30442 (R;US)
Chemical/hydrogen energy systems. Annual report, January 1, 1983-December 31, 1983, 9:30433 (R;US)
Conversion of the BNL 200 MeV Linac to H^- and polarized H^- acceleration, 9:31502 (R;US)
Discussion of the Ionian and Levantine Seas, NATO workshop on atmospheric and oceanic circulation in the Mediterranean basin, 9:31698 (R;US)
FRANTIC II: applications to standby safety systems, 9:30936 (R;US)
Future accelerators using micro-fabrication technology, 9:31469 (R;US)
Glueballs and beyond, 9:32013 (R;US)
Industrial process models of electricity demand. Volume 3: The iron and steel industry. Final report, 9:31038 (R;US)
Industrial process models of electricity demand. Volume 4. The aluminum industry. Final report, 9:31039 (R;US)
Neutron diffraction and the decomposition of membrane scattering profiles into the scattering profiles of their molecular components, 9:31733 (R;US)
Neutron scattering studies of the H2a-H2b and $(H3\text{-}H4)_2$ histone complexes, 9:31728 (R;US)
Particle ratios at high transverse momentum in pp collisions at $\sqrt{s}$ = 63 GeV and correlations between high p/sub T/ identified charged particles and associated identified charged particles, 9:31980 (R;US)
Review of a test program for qualifying the solidification of Epicor-II resins with cement, 9:30346 (R;US)
Shell model study of $^{90\text{-}98}$Zr, 9:32106 (R;US)
SLIM-MAUD: an approach to assessing human error probabilities using structured expert judgment. Volume I. Overview of SLIM-MAUD, 9:30933 (R;US)
Theory of the Fe^{2+}-Fe^{3+} electron exchange in water, 9:31314 (R;US)
Brown Boveri Electric, Inc., Greensburg, PA (USA)
Compact capacitor/filter development. Final report, 9:30971 (R;US)
Brown Univ., Providence, RI (USA)
Interactions of molecules with surfaces. Progress report, February 1, 1983-January 31, 1984, 9:31248 (R;US)
Brown Univ., Providence, RI (USA). Div. of Engineering
Comparison of methods for calculating energy release rates, 9:31365 (R;US)
Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)
About the behaviour of thermal insulating systems under heavy weathering conditions, 9:31052 (R;DE;In German)
Air-conditioning, ergonomical and safe design of engineers cabins of Diesel locomotives in hard coal mining, 9:31370 (R;DE;In German)
Construction and operation of a pilot plant for further development of the LR-process, 9:30267 (R;DE;In German)
Development of a simple wind speedometer for application in countries of the developing world, 9:30593 (R;DE;In German)
Driving of a stone drift using the 'New Austrian Tunnelling Method' at Nordstern colliery, 9:31461 (R;DE;In German)

Dust suppression with gateroad production by shearer-loader along with the face line, 9:31460 (R;DE;In German)
Electrified driving of stone drifts, 9:30191 (R;DE;In German)
Energy advising in the FR of Germany - methods for estimating the demand of tenants, owners and flat administrations, 9:31051 (R;DE;In German)
Examination of the final design of the rotor blades GROWIAN I, 9:30597 (R;DE;In German)
Further development of a noise logging system, 9:30185 (R;DE;In German)
Investigation of sources of selected substances and their remaining in sewage sludge, 9:31082 (R;DE;In German)
Operational demonstration of a field of high performance flat plate collectors with isothermal heat transport, 9:30563 (R;DE;In German)
Prototype plant for nuclear process heat (PNP), reference phase. R+D-work on hydrogasification of coal (HKV), 9:30098 (R;DE;In German)
Research and development on the encapsulation of solar cells with improved potting and cover materials, 9:30508 (R;DE;In German)

Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)
Italy - energy situation 1982, 9:30247 (R;DE;In German)
Saudi Arabia - energy situation 1982, 9:31023 (R;DE;In German)
Switzerland - energy situation 1982, 9:30995 (R;DE;In German)
Zaire - energy situation 1982, 9:30991 (R;DE;In German)

Bureau of Mines, Twin Cities, MN (USA). Twin Cities Research Center
Coal-cutting forces and primary dust generation using radial gage cutters. Report of investigations/1983, 9:30210 (R;US)

Bureau of Reclamation, Denver, CO (USA). Engineering and Research Center
Cation exchange pretreatment studies for high recovery - Yuma desalting plant, 9:31325 (R;US)

C

Cable Technology Labs., Inc., New Brunswick, NJ (USA)
Workshop proceedings: electrical testing of extruded-dielectric power transmission cables, 9:30686 (R;US)

Cabot Consulting Group, Washington, DC (USA)
Transportation energy contingency planning: transit fuel supplies under decontrol, 9:31073 (R;US)
Transportation energy management: fuel futures, 9:31079 (R;US)

California Energy Resources Conservation and Development Commission, Sacramento (USA)
Annual petroleum review. 1982 annual report to the Legislature. Volume 2, 9:30249 (R;US)
Annual petroleum review. Volume 1, 9:30248 (R;US)

California Inst. of Tech., Pasadena (USA)
Combustion of calcium-exchanged coal. 2nd quarterly report, 9:31455 (R;US)

California State Univ., Long Beach (USA). Dept. of Biology
Survey of the marine benthic infauna collected from the United States radioactive waste disposal sites off the Farallon Islands, California. Final report, 9:30349 (R;US)

California Univ., Davis (USA). Dept. of Mechanical Engineering
Molecular beam sampling of transient combustion, 9:31362 (R;US)

California Univ., Davis (USA). Div. of Materials Science and Engineering
Role of sintering in the oxidation-reduction of palladium powders, 9:31147 (R;US)

California Univ., Los Angeles (USA)
Design and prototype results of a far-infrared interferometer for MFTF-B, 9:32330 (R;US)
START/TM: a study of start-up and fractional power operation of tandem mirror fusion reactors, 9:32351 (R;US)

California Univ., Los Angeles (USA). Dept. of Electrical Engineering
Studies of CO_2 laser interactions with plasmas. Final technical report, 1 January 1981-30 March 1983, 9:32348 (R;US)

California Univ., Los Angeles (USA). School of Public Health
Methanogenesis from acetate, a key intermediate in nature. Annual progress report, 1983-1984, 9:30455 (R;US)

California Univ., Riverside (USA)
Novel analytical approaches to coal beneficiation. Quarterly report, 9:30162 (R;US)

California Univ., Santa Barbara (USA). Dept. of Chemical and Nuclear Engineering
Experimental data report on condensation in a single inverted U-tube, 9:30871 (R;US)

California Univ., Santa Barbara (USA). Inst. for Polymers and Organic Solids
Charge storage in doped poly(thiophene). Technical report, 9:30977 (R;US)

Cal Recovery Systems, Inc., Richmond, CA (USA)
Composition and properties of municipal solid waste and its components. Final report, 9:31107 (R;US)

Cambridge Univ. (UK)
Particle ratios at high transverse momentum in pp collisions at $\sqrt{s}$ = 63 GeV and correlations between high p/sub T/ identified charged particles and associated identified charged particles, 9:31980 (R;US)

Canada Centre for Mineral and Energy Technology, Ottawa, Ontario
Assessment of the microbial populations in field and test pit experiments at Elliot Lake, Ontario, Canada, 9:30344 (R;CA)
Calibration of environmental monitors operating on time integrating principles for radon/thoron decay products, 9:31560 (R;CA)
Chlorine-assisted leaching of Key Lake uranium ore, 9:30283 (R;CA)
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Progress report on a technical evaluation of four personal alpha-dosimeters in two underground uranium mines in the Elliot Lake area, 9:31558 (R;CA)
Removal of radioactive radium (Ra^{226}) from chloride liquors by columnar ion exchange in the presence of calcium, magnesium and iron cations. Progress report No. 3, 9:30284 (R;CA)
Tree growth studies on uranium mill tailings, 9:30386 (R;CA)

Canada Centre for Mineral and Energy Technology, Ottawa, Ontario. Mining Research Labs.
Joint Panel on Occupational and Environmental Research for Uranium Production 1981 annual report, 9:30392 (R;CA)

Carnegie-Mellon Univ., Pittsburgh, PA (USA). Center for Energy and Environmental Studies
Modelling and assessment of advanced processes for integrated environmental control of coal-fired power plants. Technical progress report, 9:30651 (R;US)
Modelling and assessment of advanced processes for integrated environmental control of coal-fired power plants. Technical progress report, 9:30652 (R;US)
Program of basic research on the utilization of coal-water mixture fuels, 9:30213 (R;US)

Cekmece Nuclear Research and Training Center, Istanbul (Turkey)
Investigation of biokinetics of cadmium in the mussel in various environmental conditions, 9:31801 (R;TR;In Turkish)
Investigation of the response of improved self-powered neutron detectors, 9:31529 (R;TR;In Turkish)

Centec Corp., Reston, VA (USA)
Environmental and energy benefits of microprocessor control of oven airflows from metal painting operations, 9:31085 (R;US)

Center for Energy and Environment Research, Mayaguez (Puerto Rico)
Distributional and socioeconomic impacts of electricity price increases on the Puerto Rican population. Volume 2, 9:31724 (R;US)
Ecological analysis of spatial and temporal patterns of pelagic ecosystem components potentially interacting with an OTEC (Ocean Thermal Energy Conversion) plant near Punta Tuna, Puerto Rico: physical characteristics. Final report, 9:30543 (R;US)
Generation of mesoscale hydrodynamic phenomena by the Grappler and Whiting Seamounts, southeast of Puerto Rico. Master thesis, 9:31859 (R;US)

Central Electricity Generating Board, Berkeley (UK). Berkeley Nuclear Labs.
Methods for assessing the long term radiological consequences of radionuclide entry into groundwater, 9:31719 (R;GB)

Centre d'Etude de l'Energie Nucleaire, Mol (Belgium)
Annual report 1982, 9:32393 (R;BE)

Pu-content verification by calorimetry, 9:30404 (R;US)
Centre National de la Recherche Scientifique, 75 - Paris (France)
Dimensioning of the Hitec circuit of the Them-Thek preliminary project (After-Themis studies), 9:30542 (R;FR;In French)
Centre Scientifique et Technique de l'Industrie Textile Belge (CENTEXBEL), Brussels
Heat resistant protective clothing, 9:31822 (R;US;FR)
Chemical Coaters Association, Wheaton, IL (USA)
Environmental and energy benefits of microprocessor control of oven airflows from metal painting operations, 9:31085 (R;US)
Chem-Pro Corp., Fairfield, NJ (USA)
Laboratory tests of phenol removal and ammonia and hydrogen sulfide stripping from SRC-I wastewater. Final technical report, 9:30132 (R;US)
Chevron Research Co., Richmond, CA (USA)
Refining and upgrading of synfuels from coal and oil shales by advanced catalytic processes, 9:30113 (R;US)
City Coll., New York (USA)
Glueballs and beyond, 9:32013 (R;US)
City Coll., New York (USA). Dept. of Physics
Bates GaAs polarized electron source, 9:31503 (R;US)
City Univ. of New York, NY (USA)
Non-geometrical optics investigation of mode conversion in weakly relativistic inhomogeneous plasmas. Annual progress report, September 14, 1983-May 14, 1984, 9:32305 (R;US)
Colorado Geological Survey, Denver (USA)
Evaluation of coking coals in Colorado. Resource Series 7, 9:30186 (R;US)
Helium and ground temperature surveys at Steamboat Springs, Colorado. Special Publication 21, 9:30580 (R;US)
Preliminary investigation and feasibility study of environmental impact of energy resource development in the Denver Basin, 9:30183 (R;US)
Colorado School of Mines, Golden (USA)
Pyrolysis and gasification kinetics of densified biomass. Final report, 9:30454 (R;US)
Colorado School of Mines, Golden (USA). Dept. of Geology
Remanent and rock magnetic properties at the Hanna, Wyoming underground coal gasification site: Hanna II phases 2 and 3 experiment, 9:30117 (R;US)
Colorado Univ., Denver (USA). Health Sciences Center
Hydrocarbon-induced cancer risks in oil shale processing, 9:30274 (R;US)
Columbia Univ., New York (USA)
Safety and deterministic failure analyses in high-beta D-D tokamak reactors, 9:32352 (R;US)
Columbia Univ., New York (USA). Cancer Center
Versatility of laser induced fluorescence line narrowing in chemical analysis, 9:31288 (R;US)
Columbia Univ., New York (USA). Dept. of Biochemistry
Neutron diffraction and the decomposition of membrane scattering profiles into the scattering profiles of their molecular components, 9:31733 (R;US)
Columbia Univ., New York (USA). Dept. of Chemistry
Mechanism of Ziegler-Natta polymerization of acetylene: a nutation NRMR study. Technical report, 22 Jun 82-9 Dec 83, 9:31242 (R;US)
Columbia Univ., New York (USA). Radiological Research Lab.
Radiation physics, biophysics and radiation biology. Progress report, October 1, 1982-November 1983, 9:31753 (R;US)
Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory
Geologic observations at the 2800-meter radioactive waste disposal site and associated deepwater dumpsite 106 (DWD-106) in the Atlantic Ocean. (Revised). Final report, 9:31858 (R;US)
Combustion Engineering, Inc., Chattanooga, TN (USA). Chattanooga Nuclear Operations
Investigation of steam generator corrosion products under typical PWR operating conditions. Final report, 9:30715 (R;US)
Combustion Engineering, Inc., Windsor, CT (USA)
Wear measurements of nuclear power plant components. Final report, 9:30698 (R;US)
Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro
3. National Meeting of Reactor Physics, 9:30796 (R;BR)
Authorization for the functioning of service laboratories for personal monitoring, 9:31011 (R;BR;In Portuguese)
Physical protection of nuclear operational units, 9:30393 (R;BR;In Portuguese)
Safety of systems for the retention of wastes containing radionuclides, 9:30318 (R;BR;In Portuguese)
Standard model for safety analysis report of fuel reprocessing plants, 9:30388 (R;BR;In Portuguese)
Standard model for safety analysis report of fuel fabrication plants, 9:30317 (R;BR;In Portuguese)
Comitato Nazionale per l'Energia Nucleare, Casaccia (Italy). Dipartimento Radiazioni e Ricerche di Sicurezza e Protezione
Method for evaluation of atmospheric stability: application to the Casaccia site, 9:31642 (R;IT;IT)
Comitato Nazionale per l'Energia Nucleare, Frascati (Italy). Lab. Nazionali di Frascati
Adone parameters, beam structure and luminosity, 9:31526 (TG;US)
Commission of the European Communities, Ispra (Italy). Joint Nuclear Research Center
Two-dimensional vapor flow analysis in heat pipes, 9:31418 (R;US)
Commission of the European Communities, Ispra (Italy). Joint Research Centre
Pu-content verification by calorimetry, 9:30404 (R;US)
Connecticut Univ., Farmington (USA). Div. of Cardiology
Neutron diffraction and the decomposition of membrane scattering profiles into the scattering profiles of their molecular components, 9:31733 (R;US)
CONSAD Research Corp., Vienna, VA (USA)
REGSHARE model systems and data base guide, 9:30992 (R;US)
Conservation and Renewable Energy Inquiry and Referral Service, Silver Spring, MD (USA)
Solar energy and your home: questions and answers, 9:30547 (R;US)
Coordinating Research Council, Inc., Atlanta, GA (USA)
Relationship between vehicle fuel temperature and ambient temperature. 1981 CRC (Coordinating Research Council) Kapuskasing field test. Final contractor report, 9:30251 (R;US)
Council for Mineral Technology, Randburg (South Africa)
Mineralogical investigation of a refractory gold ore, and of a sulphide concentrate and calcined tailing from that ore, 9:31291 (R;ZA)
Cryogenic Consulting Service, Inc., Weston, CT (USA)
Low-purity oxygen production study. Final report, 9:30143 (R;US)

D

Dane County Regional Planning Commission, Madison, WI (USA)
Estimating transportation energy consumption of residential land types. Final report, 9:31078 (R;US)
Daresbury Lab. (UK)
Application of synchrotron radiation to problems in materials science. Proceedings, 9:31141 (R;GB)
Davis Energy Group, CA (USA)
Residential heat pump with public water main heat exchanger, 9:31061 (R;US)
Decision Focus, Inc., Los Altos, CA (USA)
Decision framework for ambient air quality standards. Volume 1. Methodology and model structure. Final report, 9:30998 (R;US)
Decision Focus, Inc., Palo Alto, CA (USA)
Development of an analytical framework to assess the role of new technologies for liquid and gaseous fuels. Volume I. Background. Final report, 9:31024 (R;US)
Defence Research Establishment, Ottawa, Ontario (Canada)
Properties of fuels employed in a gas turbine combustor program. Technical note, 9:30441 (R;US)
Delaware Univ., Newark (USA). Coll. of Marine Studies
Ecology of tidal marshes of the Pacific Northwest Coast: a community profile, 9:31699 (R;US)
Department of Agriculture, Washington, DC (USA)
Regulation of expression of a soybean storage protein subunit gene. Progress report, 9:31729 (R;US)
Department of Energy, Idaho Falls, ID (USA). Idaho Operations Office
Emerging technology from the DOE industrial heat pump program, 9:31087 (R;US)

Department of Energy, Oak Ridge, TN (USA). Technical Information Center
DOE Energy Data Base: input magnetic tape description, 9:32435 (R;US)
DOE patents available for licensing. A bibliography for the period 1966-1974. Supplement 1, 9:32395 (R;US)
Department of Energy, Washington, DC (USA)
U.S. fast reactor materials and structures program, 9:30762 (R;US)
Department of Energy, Washington, DC (USA). Office of Industrial Programs
Energy conservation in fertilizer production, 9:31089 (R;US)
Department of Energy, Washington, DC (USA). Office of Inspector General
Semiannual report - 1st half FY 1984, October 1, 1983-March 31, 1984, 9:32394 (R;US)
Department of National Health and Welfare, Ottawa, Ontario (Canada). Health Protection Branch
Radiation hazard control in hospitals. Training manual I, 9:31734 (R;CA)
Department of Scientific and Industrial Research, Petone (New Zealand). Industrial Processing Div.
Anode carbon from buller coal, New Zealand, 9:30154 (R;US)
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.)
IEA/SSPS - CRS Workshop, April 1983. Executive summary, 9:30530 (R;US)
District of Columbia Energy Office, Washington (USA). Residential Energy Programs Div.
District of Columbia Energy Extension Service Non-Pilot State Grant Program. Final report, 9:31136 (R;US)
Dortmund Univ. (Germany, F.R.). Abt. Chemietechnik
Calculation equation of the condensation in hydrocarbon mixtures under the influence of heavy volatile components and taking hydrogen into consideration, using a thermal state equation, 9:30263 (R;DE;In German)
Duerr Anlagenbau G.m.b.H., Stuttgart (Germany, F.R.)
New thermal waste heat purification system: operating criteria and the four main constructional features, 9:31092 (R;DE;In German)
Duesseldorf Univ. (Germany, F.R.). Medizinische Fakultaet
In vitro autoradiographic studies for determination of mitotic index and labelling index in biopsies of the human oral mucosa, 9:31745 (R;DE;In German)
Influence of lead on the immun defense against tumor cells: 'In vitro-experiment with the LMC-test', 9:31810 (R;DE;In German)
Dunlap (Richard D.), Cape Girardeau, MO (USA)
Solar heating, cooling and controller system for industrial and commercial building, 9:30555 (R;US)
Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
Evaluation of zeolite mixtures for decontaminating high-activity-level water at the Three Mile Island Unit 2 Nuclear Power Station, 9:30833 (R;US)
Jet impact force studies, 9:30324 (R;US)
Two-stage precipitation of plutonium trifluoride, 9:30294 (R;US)
Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant
Groundwater pollution control, 9:31707 (R;US)

E

Earth Satellite Corp., Washington, DC (USA)
Utilization of snow enhancement techniques for acquisition of geological and geo-environmental information from ERTS imagery, 9:31831 (R;US)
Ecole Polytechnique, 91 - Palaiseau (France). Centre de Mathematiques Appliquees
Numerical diffraction by a uniform grid, 9:32296 (TG;US)
Economic Research Service, Washington, DC (USA). Marketing Economics Div.
Caustic dry peeling of cling peaches to reduce water pollution: its economic feasibility. Agricultural economic report, 9:31711 (R;US)
Economic Research Service, Washington, DC (USA). Natural Resource Economics Div.
Evaluation of four completed small watershed projects: South Carolina, Maryland, Idaho-Nevada, and West Virginia. Agricultural economic report, 9:31006 (R;US)
ECO Northwest (USA)
Economic analysis of the environmental effects of a combustion-turbine generating station at Frederickson Industrial Park, Pierce County, Washington. Final report, 9:31725 (R;US)
EG and G Idaho, Inc., Idaho Falls (USA)
Application of a thermocouple-correlation-type transit-time flowmeter in a pressurized water reactor environment, 9:30869 (R;US)
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Geothermal energy: a brief assessment, 9:30575 (R;US)
Instrumentation for real-time ultrasonic sensing of arc welding characteristics, 9:31421 (R;US)
Neutron multiplicities of ^{252}Cf and the fissile nuclei. Final report, 9:32146 (R;US)
New techniques for adjusting reference factors, 9:31367 (R;US)
Practical writing and editing techniques, 9:32396 (R;US)
Radioactive waste management as approached by nuclear materials management, 9:30396 (R;US)
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RELAP5/MOD2 post-CHF heat and mass transfer models, 9:30864 (R;US)
Safety monitoring in process and control, 9:30824 (R;US)
Surface modification and coatings: a technical assessment, 9:31148 (R;US)
Terminal oversight: the editor and the word processor, 9:32397 (R;US)
Waste Experimental Reduction Facility: description and progress report, 9:30325 (R;US)
EG and G Idaho, Inc., Idaho Falls (USA). Water Reactor Research Dept.
Development of a fluid finite element, 9:30868 (R;US)
Moving force on a fluid supported beam, 9:30867 (R;US)
Electric Power Research Inst., Palo Alto, CA (USA)
EPRI research on power plant mechanical auxiliaries, 9:30702 (R;US)
Proceedings: workshop on corrosion product sampling from hot water systems, 9:30693 (R;US)
Energy and Environmental Analysis, Inc., Arlington, VA (USA)
Advanced research and technoloty: University Coal Research Program, 9:30096 (R;US)
Energy and Environmental Engineering, Inc., Cambridge, MA (USA)
Assessment of hydrocarbon and particulate emissions control and wastewater treatment technology for the solvent refined coal-II process. Volume I. Executive summary, 9:30180 (R;US)
Assessment of hydrocarbon and particulate emissions control and wastewater treatment technology for the Solvent Refined Coal-II process. Volume II. Technical report, 9:30181 (R;US)

Energy Engineering Group, Inc., Idaho Springs, CO (USA)
Experimental study of thermocirculation in a variable geometry Trombe wall. Final report, 9:30550 (R;US)
Energy Security Analysis, Washington, DC (USA)
Oil inventory capacity in selected countries and estimates of global inventory fluctuations: 1978 to 1982, 9:30243 (R;US)
Environmental Films, Inc., St. Johnsbury, VT (USA)
Violent tornado climatography, 1880-1982, 9:31644 (R;US)
Environmental Protection Agency, Cincinnati, OH (USA). Environmental Monitoring and Support Lab.
Reference materials for water and wastewater analyses in USEPA (U.S. Environmental Protection Agency), 9:31714 (R;US)
Environmental Protection Agency, Montgomery, AL (USA). Eastern Environmental Radiation Facility
Environmental radiation data report 34, April-June 1983, 9:31691 (R;US)
Radiological survey of Ingalls Shipbuilding Division, Pascagoula, Mississippi, and environs, 9:31692 (R;US)
Environmental Protection Agency, Research Triangle Park, NC (USA). Emission Standards and Engineering Div.
Synthetic fiber production facilities: background information for promulgated standards, 9:31726 (R;US)
Environmental Protection Agency, Research Triangle Park, NC (USA). Office of Air Quality Planning and Standards
National Emissions Data System (NEDS) fuel use report, 1981, 9:30999 (R;US)
Environmental Science and Engineering, Inc., Gainesville, FL (USA)
Corrosion manual for internal corrosion of water distribution systems, 9:31696 (R;US)
Erevanskij Fizicheskij Inst. (USSR)
Contribution of cosmic muons to the spectrum of hadrons detected by the "Pion" installation, 9:31532 (R;SU;In Russian)
Heterogeneous effects and influence of an output channel during neutron spectra measurement by the time-of-flight method, 9:32239 (R;SU;In Russian)
Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Ingenieurwissenschaften
Utility of the properties of salt and water systems at high pressures for catalytic coal gasification, 9:30149 (R;DE;In German)
Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Medizinische Fakultaet
Postmortum incorporation of ^{3}H-thymidine into human oral mucosa at +4°C ambient temperature. Histoautoradiographic studies, 9:31746 (R;DE;In German)
Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Naturwissenschaftliche Fakultaet 1 - Mathematik und Physik
HFB+nQP-method for the description of the rotational bands of deformed nuclei, 9:32158 (R;DE ;In German)
Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Technische Fakultaet
Investigations on flow-induced vibrations and fluid-elastic phenomena in PWR-models, 9:30732 (R;DE;In German)
ESG, Inc., Atlanta, GA (USA)
Passive solar commercial buildings project. Project status report, January 1-January 31, 1984, 9:30548 (R;US)
European Organization for Nuclear Research, Geneva (Switzerland)
3081/E processor, 9:32420 (R;US)
Particle ratios at high transverse momentum in pp collisions at $\sqrt{s}$ = 63 GeV and correlations between high p/sub T/ identified charged particles and associated identified charged particles, 9:31980 (R;US)
Evans (Robert F.), Dallas, TX (USA)
Shock mounted Stratapax oil well drilling bits. Final technical report, 9:30228 (R;US)
Exxon Nuclear Co., Inc., Richland, WA (USA)
Demonstration of 9x9 assemblies for BWRs. Final report, 9:30699 (R;US)

F

Faucett (Jack) Associates, Inc., Chevy Chase, MD (USA)
Effect of US coal exports on domestic economic growth and on US national security, 9:30153 (R;US)
Federal Energy Regulatory Commission, Washington, DC (USA). Office of Electric Power Regulation
Susitna Hydroelectric Project, FERC No. 7114 - Alaska. Volume 1. Main text. Draft environmental impact statement, 9:30495 (R;US)
Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 2. Appendices A through D. Draft environmental impact statement, 9:30496 (R;US)
Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 5. Appendices J and K. Draft environmental impact statement, 9:30499 (R;US)
Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 4. Appendices H and I. Draft environmental impact statement, 9:30498 (R;US)
Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 6. Appendices L and M. Draft environmental impact statement, 9:30500 (R;US)
Susitna hydroelectric project, FERC No. 7114 - Alaska. Volume 7. Appendices N and O. Draft environmental impact statement, 9:30501 (R;US)
Sustina hydroelectric project, FERC No. 7114 - Alaska. Volume 3. Appendices E through G. Draft environmental impact statement, 9:30497 (R;US)
Fermi National Accelerator Lab., Batavia, IL (USA)
Fermilab research program workbook, 9:32061 (R;US)
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Search for neutral, penetrating, metastable particles produced in the SLAC beam dump, 9:31982 (R;US)
Finnish Meteorological Inst., Helsinki
Study of sulphur and suspendings in the air in the town Lahti (Finland), 9:31652 (R;FI;In Finnish)
Fish and Wildlife Service, Albuquerque, NM (USA)
Turtles, birds, and mammals in the northern Gulf of Mexico and nearby Atlantic waters: an overview based on aerial surveys of OCS (Outer Continental Shelf) areas, with emphasis on oil and gas effects, 9:31701 (R;US)
Fish and Wildlife Service, Fort Collins, CO (USA). Western Energy and Land Use Team
Effects of acid precipitation on aquatic resources: results of modeling workshops, 9:31709 (R;US)
Fish and Wildlife Service, Kearneysville, WV (USA). Eastern Energy and Land Use Team
Effects of acid precipitation on aquatic resources: results of modeling workshops, 9:31709 (R;US)
Florida Solar Energy Center, Cape Canaveral (USA)
Solar collector testing program. Part 1: efficiency and exposure tests. Final report, 9:30565 (R;US)
Solar collector testing program. Part II: all-day efficiency tests. Final report, 9:30566 (R;US)
Florida Solar Energy Center, Cape Canaveral (USA). Research and Development Div.
Residential conservation demonstration: domestic hot water. Final report, 9:31064 (R;US)
Florida Univ., Gainesville (USA)
Optical sensing systems for robotic manipulators, 9:31373 (R;US)
Florida Univ., Gainesville (USA). Center for Intelligent Machines and Robotics
Design and fabrication of a four degree-of-freedom force feedback planar manual controller, 9:31378 (R;US)
Force and optical position sensors: limitations of sensors and sensing systems in robotic applications, 9:31381 (R;US)
Kinematic control of a robotic manipulator with a unilateral manual controller, 9:31379 (R;US)
Florida Univ., Gainesville (USA). Dept. of Electrical Engineering
Antagonistic control of dc motors: a theoretical and experimental study, 9:31372 (R;US)
Choice of target data in optimum design of electrical motors, 9:31380 (R;US)
Electric motors and controls for intelligent machines, 9:31371 (R;US)
Optimum design of electric motor for multilink manipulator, 9:31375 (R;US)
Range scanning peripheral for an autonomous mobile device, 9:31374 (R;US)
Flowpower, Inc., Huntington Station, NY (USA)
High yield wind energy resources in the mid-Hudson River basin. Final report, 9:30594 (R;US)

Foreign Agricultural Service, Washington, DC (USA)
World oilseed situation and US export opportunities, November 1983. Foreign agriculture circular, 9:31004 (R;US)
World oilseed situation and US export opportunities, June 1982. Foreign agriculture circular, 9:31005 (R;US)
Forest Service, Duluth, MN (USA). North Central Forest Experiment Station
Economic and energy analysis of poplar intensive cultures in the Lake States, 9:31043 (R;US)
Forest Service, Ogden, UT (USA). Intermountain Forest and Range Experiment Station
Construction cost and erosion control effectiveness of filter windrows on fill slopes. Forest Service research note, 9:31695 (R;US)
Forest Service, Rhinelander, WI (USA). North Central Forest Experiment Station
Economic and energy analysis of poplar intensive cultures in the Lake States, 9:31043 (R;US)
Foster-Miller Associates, Inc., Waltham, MA (USA). Engineering Systems Group
Technical progress report No. 33 USBM contract JO318097; FMI-BMI-8148, April 1-April 30, 1984, 9:30199 (R;US)
Foster-Miller, Inc., Waltham, MA (USA)
Slack and overload rope protection system. Open file report, 28 Mar 79-15 Jan 83, 9:30211 (R;US)
Frankfurt Univ. (Germany, F.R.). Fachbereich Physik
Collective mass and zero-point energy in the generator-coordinate method, 9:32184 (R;DE;In German)
Freie Univ. Berlin (Germany, F.R.). Fachbereich Physik
Study of the reaction mechanisms in the system $^{20}Ne + {}^{197}Au$ at projectile energies between 7.5 and 20 MeV/u, 9:32139 (R;DE;In German)
French Government, Paris
Act No. 83-630 of 12 July 1983 concerning democratization of public enquiries and protection of the environment, 9:30790 (R;FR;In French)
Decree No. 82-734 of 24 August 1982 amending Decree No. 70-878 of 29 September 1970 (as amended) and Decree No. 72-1158 of 14 February 1972 (as amended) concerning the Atomic Energy Commission, 9:30789 (R;FR;In French)
Decree No. 73-138 of 12 February 1973 in implementation of the Act of 1 August 1905 on repression of fraud concerning chemical products in human foodstuffs and articles in contact with food and beverages for human and animal consumption, as well as processes and products used for cleaning such articles, 9:31784 (R;FR;In French)
Decree No. 82-531 of 22 June 1982 on the Higher Council for Nuclear Safety, 9:30788 (R;FR;In French)
Decree No. 82-918 of 26 October 1982 concerning the High Council for Nuclear Safety, 9:30786 (R;FR;In French)
Order of 24 June 1982 on the technical conditions for controlling and accounting of nuclear materials, 9:30397 (R;FR;In French)
Futures Group, Glastonbury, CT (USA)
Market potential of electrolytic hydrogen production in three northeastern utilities' service territories. Final report, 9:30434 (R;US)

G

GA Technologies, Inc., San Diego, CA (USA)
High power neutral beam heating on Doublet III, 9:32311 (R;US)
Remote examination of Fort St. Vrain HTGR fuel and reflector elements, 9:30745 (R;US)
Spiral fluted tubing for augmented heat transfer in process industries. Final report, 9:31090 (R;US)
General Accounting Office, Washington, DC (USA). Information Management and Technology Div.
Software problems in the development of the Defense Fuel Automated Management System, 9:30244 (R;US)
General Accounting Office, Washington, DC (USA). Office of the Comptroller General
Implementation of the national minerals and materials policy needs better coordination and focus, 9:31001 (R;US)
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General Accounting Office, Washington, DC (USA). Resources, Community and Economic Development Div.
DOE needs to evaluate fully the waste management effects of extending the useful life of nuclear fuel, 9:30333 (R;US)
DOE's safety and health oversight program at nuclear facilities could be strengthened, 9:31013 (R;US)
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General Dynamics/Convair, San Diego, CA (USA)
High field Nb_3Sn Axicell insert coils for the Mirror Fusion Test Facility-B (MFTF-B) axicell configuration. Final report, 9:32367 (R;US)
General Electric Co., Cincinnati, OH (USA). Nuclear Systems Programs
T-111 Rankine system corrosion test loop. Volume I, 9:31422 (R;US)
General Electric Co., Malverne, PA (USA). Power Systems Management Business Dept.
Protection of New York State Electric Utility Distribution Systems containing decentralized storage and generation devices. Final report, 9:30608 (R;US)
General Electric Co., Richland, WA (USA). Hanford Atomic Products Operation
Nuclear materials control in irradiated fuel reprocessing, 9:30394 (R;US)
General Electric Co., Schenectady, NY (USA). Advanced Energy Programs Dept.
Electrode-induced beta battery degradation. Final report, 9:30980 (R;US)
General Electric Co., Schenectady, NY (USA). Corporate Research and Development Dept.
Development of a high temperature pH electrode for geothermal fluids. Final report, Task 1, 9:30586 (R;US)
Improvement in accuracy of prediction of electrical machine constants and generator models for subsynchronous resonance conditions. Volume 1. Three-dimensional electromagnetic field analysis of electrical machinery. Final report, 9:30645 (R;US)
Improvement in accuracy of prediction of electrical machine constants and generator models for subsynchronous resonance conditions. Volume 2. Application of two-dimensional finite-element techniques for synchronous machine modeling. Final report, 9:30646 (R;US)
General Electric Co., Schenectady, NY (USA). Large Steam Turbine-Generator Dept.
Determination of torsional fatigue life of large turbine generator shafts. Final report, 9:31385 (R;US)
General Electric Co., St. Petersburg, FL (USA). Neutron Devices Dept.
Interaction of thin erbium films with aluminum, 9:30440 (R;US)
Review of anode phenomena in vacuum arcs, 9:32312 (R;US)
General Research Corp., McLean, VA (USA)
Liming of acidified waters: a review of methods and effects on aquatic ecosystems. Final report, 9:31710 (R;US)
Geological Survey, Denver, CO (USA)
Eruptive history of the Dieng mountains region, central Java, and potential hazards from future eruptions, 9:31836 (R;US)
Evaluation of seismic reflection studies in the Yucca Mountain area, Nevada test site, 9:30361 (R;US)
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Geohydrologic and drill-hole data for test well USW H-3, Yucca Mountain, Nye County, Nevada, 9:30362 (R;US)
Geological Survey, Menlo Park, CA (USA)
Catalog of earthquakes in southern Alaska, April-June 1980, 9:31835 (R;US)
Geological Survey of Canada, Ottawa, Ontario
Uranium in granites. Proceedings of a workshop, 9:30280 (R;CA)
Geological Survey, Reston, VA (USA)
Hydrology of Area 6, Eastern Coal Province, Maryland, West Virginia, and Pennsylvania, 9:30190 (R;US)
Procedures for assessment of cumulative impacts of surface mining on the hydrologic balance, 9:30212 (R;US)
Workshop on continuing actions to reduce losses from earthquakes in the Mississippi Valley area, 9:31823 (R;US)

Geological Survey, Salt Lake City, UT (USA)
Preliminary hydrologic evaluation of the North Horn Mountain coal-resources area, Utah, 9:30189 (R;US)
George Washington Univ., Washington, DC (USA)
Nitration of oximes. The nitration of azines. Final technical report, 5 Dec 49-4 Dec 51, 9:31313 (R;US)
Georgia Inst. of Tech., Atlanta (USA)
Investigation of neutral beam driven impurity flow reversal as an impurity control method in future tokamaks, 9:32313 (R;US)
Rotation and impurity transport in a tokamak plasma with directed neutral beam injection, 9:32314 (R;US)
Georgia Inst. of Tech., Atlanta (USA). Engineering Experiment Station
High accuracy radiation efficiency measurement techniques. Final technical report, 9:31428 (R;US)
Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering and Health Physics
Survey of the methods of MHD analysis of magnetic islands, 9:32354 (R;US)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.)
Conditions for the storage of low-level radioactive wastes in the ASSE salt mine, 9:30364 (TG;US)
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Methods for pre-assessing the chemical-pollutant load of Bavaria's population (period: 10-20 years), 9:31685 (R;DE;In German)
Goettingen Univ. (Germany, F.R.). Juristischer Fachbereich
Control density of the administrative courts with regard to nuclear licensing, 9:30787 (R;DE;In German)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow
Reports of 2. All union conference on technological problems of thermonuclear reactors. Volume 2, 9:32357 (R;SU;RU)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii
Benchscale experiments at the "Neutrino detector" installation. ND-1, 9:31535 (R;SU;In Russian)
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Rotation of a tenuous plasma with high toroidal velocity in a tokamak, 9:32337 (TG;US)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki
Measurement and analytic representation of the magnetic field of 6-m ITEP spectrometer, 9:31626 (R;SU;In Russian)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.
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Average multiplicities in deep inelastic processes and their interpretation, 9:32014 (R;SU)
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Scattering theory for explicitely time-dependent interactions, 9:32274 (R;AT;In German)
Simple approximation for eigenvalues in quantum theory, 9:32286 (R;AT)
Grenoble-1 Univ., 38 (France). Inst. des Sciences Nucleaires
Dynamic moments of inertia in Xe, Cs and Ba nuclei, 9:32107 (R;US)
Grumman Aerospace Corp., Princeton, NJ (USA)
Monte Carlo studies of tandem mirror plasmas interacting with waves in the Ion Cyclotron Range of Frequencies (ICRF). Progress report, October 1, 1982-May 18, 1984, 9:32304 (R;US)
Gulf Research and Development Co., Pittsburgh, PA (USA)
Corrosion resistant materials for coal liquefaction systems, 9:30099 (R;US)
Gulf South Research Inst., New Orleans, LA (USA)
Enhanced coal liquefaction with ammonia and amines in single and binary solvent systems. Quarterly report, September 20-December 19, 1983, 9:30137 (R;US)

H

Hamburg Univ. (Germany, F.R.). Fachbereich Physik
Study of the space-time structure of the leptonic weak charged current by measurement of the muon polarization from the reaction anti νsub(μ)+Fe->X+μ^+, 9:31987 (R;DE;In German)
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Evaluation of ferritic alloy Fe-2-1/4Cr-1Mo after neutron irradiation - irradiation creep and swelling, 9:31149 (R;US)
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Hannover Univ. (Germany, F.R.). Fakultaet fuer Maschinenwesen
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Harvard Univ., Cambridge, MA (USA). Dept. of Physics
Bates GaAs polarized electron source, 9:31503 (R;US)
Health and Safety Executive, London (UK). Nuclear Installations Inspectorate
Sizewell B. Supplement 12. ALARP strategy for dose reduction, 9:30881 (R;GB)
Sizewell B. Supplement 13. Human factors, 9:30882 (R;GB)
Sizewell B. Supplement II. Presure circuit components, 9:30880 (R;GB)
Health Planning Council for Greater Boston, Inc., MA (USA)
Nuclear magnetic resonance (NMR) guidelines, 9:31735 (R;US)
Single photon emission computerized tomography (SPECT), 9:31807 (R;US)

Heidelberg Univ. (Germany, F.R.). Naturwissenschaftlich-Mathematische Gesamtfakultaet
Collectivity and statistics in deeply-inelastic heavy-ion collisions, 9:32185 (R;DE)
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Heist Engineering Corp., Walnut Creek, CA (USA)
Energy use reduction potential in the beet sugar industry, 9:31088 (R;US)
Heist Engineering Corp., Wilmington, NC (USA)
Energy use reduction potential in the beet sugar industry, 9:31088 (R;US)
Hessischer Minister fuer Landesentwicklung, Umwelt, Landwirtschaft und Forsten, Wiesbaden (Germany, F.R.)
Forrest diseases, 9:31809 (R;DE;In German)
Holder (Gerald), Morgantown, WV (USA)
Laboratory analysis of gas hydrate cores for evaluation of reservoir conditions. For the months December 1, 1983-April 30, 1984, 9:30262 (R;US)
Houston Univ., TX (USA)
Basic studies in the displacement of residual oil by chemical flooding. Final report, 9:30227 (R;US)
Hulbert (E.O.) Center for Space Research, Washington, DC (USA)
Measurements of spatially resolved high resolution spectra of laser-produced plasmas. FY 83 annual report, 9:32344 (R;US)
Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics
Cage effect in recoil studies, 9:31361 (R;HU)
Neutron radiography applications at the CRIP's WWR-SM research reactor, 9:32248 (R;HU;In Hungarian)
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High-efficiency multi-colored photovoltaic cells. Final report, 9:30513 (R;US)
Idaho National Engineering Lab., Idaho Falls (USA)
Implications of depth dose equivalent concept in personnel dosimetry, 9:31533 (R;US)
Monitor well responses at the Raft River, Idaho, Geothermal Site, 9:30590 (R;US)
TRAC-BDl/MOD1 post-dryout wall heat transfer, 9:30865 (R;US)
IEA Coal Research, London (UK). Economic Assessment Service
Cost of liquid fuels from coal. Part IV. Products from direct liquefaction processes, 9:30144 (R;GB)
IIT Research Inst., Chicago, IL (USA)
Assessment of materials-processing lasers. Final report, 9:31406 (R;US)
Illinois Univ., Chicago (USA)
Microprocessor enhanced real time manual control of an industrial robot, 9:31386 (R;US)
Illinois Univ., Urbana (USA)
Investigations of rare earth problems. Final report, 9:31275 (R;US)
Illinois Univ., Urbana (USA). Dept. of Ecology, Ethology and Evolution
Habitat structure and fish communities of warmwater streams, 9:31703 (R;US)
Illinois Univ., Urbana (USA). Fusion Studies Lab.
Tritium-assisted fusion breeders, 9:32366 (R;US)
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PWR waste gas system analysis. Final report, 9:30844 (R;US)
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Innsbruck Univ. (Austria). Inst. fuer Experimentalphysik
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Institute for Energy Technology, Kjeller (Norway)
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Institute of Gas Technology, Chicago, IL (USA)
Analysis of stratigraphic barriers (caprock) between sands in the cretaceous Mesa Verde formation, US DOE Multiwell Experiment, Garfield County, Colorado, 9:30253 (R;US)
Coal conversion systems technical data book, 9:30155 (R;US)
Effects of H_2S on molten carbonate fuel cells. Progress report, October 1-December 31, 1983, 9:31046 (R;US)
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Dynamic moments of inertia in Xe, Cs and Ba nuclei, 9:32107 (R;US)
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Study of the superficial sea sediments by the measurements of the reflexion coefficient, 9:30226 (R;FR;In French)
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Numerical diffraction by a uniform grid, 9:32296 (TG;US)
Instituto de Fisica Teorica, Sao Paulo (Brazil)
Gravitation as Gauge theory of Poincare Group, 9:32045 (R;BR;In Portuguese)
INTERA Environmental Consultants, Lakewood, CO (USA)
First status report on regional ground-water flow modeling for the Paradox Basin, Utah, 9:30312 (R;US)
International Atomic Energy Agency, Seibersdorf (Austria). Laboratories
Power conditioning accessories. Construction of a delayed drop-out relay and test of constant voltage transformers, 9:31388 (R;AT)
Report on intercomparison A-14 of the determination of some mineral components and radionuclides in milk powder, 9:31690 (R;AT)
International Atomic Energy Agency, Vienna (Austria)
Agreement between the Government of Canada and the Government of the Republic of Indonesia concerning the peaceful uses of nuclear energy, 9:31014 (R;CA;In English, French)
Bituminous solidification, disposal, transport and burial of spent ion-exchange resins. Part of a coordinated programme on treatment of spent ion exchange resins. Final report for the period 1 June 1980 - 30 June 1983, 9:30334 (R;AT)
Compact K-edge densitometer, 9:30402 (R;US)
Data acquisition and analysis systems for nuclear research and applications. Current status and trends. Proceedings of an advisory group meeting organized by the IAEA and held in Vienna, Austria, 13-17 September 1982, 9:32438 (R;AT)
Development of radioimmunoassay systems for the human pituitary gland. Final report for the period 1 March 1980 - 30 April 1983, 9:31730 (R;AT)
Environmental assessment methodologies for sea dumping of radioactive wastes. Report based on the joint IAEA/IMO technical committee meeting on environmental assessment methodologies for sea dumping of radioactive wastes in co-operation with UNEP held in Vienna, 30 August - 3 September 1982, 9:30385 (R;AT)
International Centre for Theoretical Physics: scientific activities in 1982, 9:31010 (R;AT)
Passive-X-ray fluorescence determination of the plutonium and uranium ratio in burnt-up fuel. Final report for the period 1 December 1981 - 30 November 1982, 9:30290 (R;AT)
Pu-content verification by calorimetry, 9:30404 (R;US)
Radioactive waste management. Volume 3. Proceedings Series, 9:30360 (R;AT)
Radiotracer studies on the degradation and dissipation of lindane under Malaysian environment. Part of a coordinated programme on the fate of persistent pesticides in the tropics,

using radioisotopes. Final report for the period 1 September 1982 - 31 August 1983, 9:31743 (R;AT)
Regional intercomparison for quality control of radioassays used in thyroid studies. Part of a coordinated programme on quality control of techniques in in-vitro assay of thyroid related hormones. Final report for the period 1 October 1978 - 31 August 1982, 9:31744 (R;AT)
Relative radiation hazards of coal based and nuclear power plants. Final report for the period 1 December 1980 - 14 February 1983, 9:30182 (R;AT)
Sample preparation techniques in trace element analysis by X-ray emission spectroscopy, 9:31623 (R;AT)
Schistosoma mansoni; relationship between membrane turnover rates and susceptibility to immune damage. Part of a coordinated programme on preparation of irradiated vaccines against some human diseases. Final report for the period 1 December 1979 - 31 August 1982, 9:31742 (R;AT)
Water reactor fuel characterization. Part of a coordinated programme on non-destructive techniques for reactor fuel characterization. Final report for the period 15 November 1979 - 15 June 1983, 9:30818 (R;AT)

International Atomic Energy Agency, Vienna (Austria). Atomic and Molecular Data Unit
International bulletin on atomic and molecular data for fusion. No. 23, 9:32315 (R;AT)

International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee
Measurement of the $^{235}U/^{238}U$ fission cross section ratio in the ^{235}U fission neutron spectrum, 9:32147 (R;AT)

International Atomic Energy Agency, Vienna (Austria). International Working Group on Fuel Performance and Technology for Water Reactors
IAEA specialists' meeting on power ramping and cycling behaviour of water reactor fuel. Summary report, 9:30820 (R;AT)
Specialists' meeting on internal fuel rod chemistry, 9:30819 (R;AT)

International Business Machines Corp., Armonk, NY (USA)
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International Business Machines Corp., Gaithersburg, MD (USA). Federal Systems Div.
Technology assessment of materials information systems. Aluminum case study, 9:31002 (R;US)
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International Centre for Theoretical Physics, Trieste (Italy)
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International Coal Refining Co., Allentown, PA (USA)
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International Laser Systems, Inc., Orlando, FL (USA)
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International Maritime Organization, London (UK)
Environmental assessment methodologies for sea dumping of radioactive wastes. Report based on the joint IAEA/IMO technical committee meeting on environmental assessment methodologies for sea dumping of radioactive wastes in co-operation with UNEP held in Vienna, 30 August - 3 September 1982, 9:30385 (R;AT)

Iowa State Univ. of Science and Technology, Ames (USA). Dept. of Chemical Engineering
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Iowa State Univ. of Science and Technology, Ames (USA). Dept. of Chemistry
Characterization and chemistry of vinylketene prepared by flash vacuum pyrolysis. Study of the flash vacuum pyrolysis of hydroaromatic compounds: 5,8-diphenyltetralin and the parent and substituted 5,6,11,12-tetrahydrodibenzo[a,e]cyclooctenes. Revision 1, 9:31322 (R;US)
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Israel Physical Society, Jerusalem
1983 annual meeting. Program and abstracts, 9:31861 (R;IL)

Italian Government, Rome
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IWG Corp., San Diego, CA (USA)
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James River Corp., Berlin, NH (USA). Engineering Dept.
James River-New Hampshire Electric, Inc. Sawmill Hydrostation Redevelopment. Final operations and maintenance report, 9:30493 (R;US)

Jet Propulsion Lab., Pasadena, CA (USA)
Photovoltaics industrialization in the world market, 9:30506 (R;US)

Johns Hopkins Univ., Laurel, MD (USA). Applied Physics Lab.
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Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods
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Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation
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JWK International Corp., Pittsburgh, PA (USA)
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Kaman Tempo, Santa Barbara, CA (USA)
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Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Chemie
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Analysis of survey data on the chemistry of twenty-three streams in the Chesapeake Bay watershed: some implications of the impact of acid deposition. Final report, 9:31712 (R;US)
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Fischer-Tropsch synthesis in slurry reactor systems. Quarterly report, November 1, 1983-January 31, 1984, 9:30456 (R;US)
Plasticity, agglomeration and volatiles secondary reactions in coal pyrolysis (Task A). Annual report, September 10, 1982-February 29, 1984, 9:30119 (R;US)
Volatiles mass transport with particles of softened coal. Technical progress report, July 27-October 26, 1983, 9:30139 (R;US)
Massachusetts Inst. of Tech., Cambridge (USA). Aeroelastic and Structures Research Lab.
Assessment of turbine-casing impact code calculations. Final report, 9:30870 (R;US)
Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Chemistry
Photochemical conversion of $H_3Os_3(CO)_{10}$(p-donor) to $H_2Os_3(CO)_9$(p-donor) in solution and on high surface area silica. Interim technical report, 9:31327 (R;US)
Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Mathematics
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Massachusetts Inst. of Tech., Cambridge (USA). Plasma Fusion Center
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Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)
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Non-technical introduction to the planning, implementation, and evaluation of utility communication programs, 9:31032 (R;US)
Michigan Univ., Ann Arbor (USA). Dept. of Materials and Metallurgical Engineering
Effect of crystallization of grain boundary phase on the high temperature strength of silicon nitride ceramics. Final report, April 1, 1980-March 31, 1984, 9:31224 (R;US)
Middle Earth Farms, Louisburg, MO (USA)
Passive solar greenhouse, middle earth farms. Final report, 9:30552 (R;US)
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Midwest Research Inst., Kansas City, MO (USA)
Study of existing RDF-cofiring experience. Volume 1. Phase I. Final report, 9:30609 (R;US)
Miljoestyrelsen, Roskilde (Denmark). Luftforureningslab.
EMEP bulletin 1981, 9:31654 (R;DK;In Danish)
Miller (James A.), Kearney, NE (USA)
Direct gain passive solar, domestic hot water and wind generation system. Final technical report, 9:30553 (R;US)
Ministerstvo na Narodnoto Zdrave, Sofia (Bulgaria)
Fourth scientific practical conference of the roentgenologists, radiologists and radiobiologists from North Bulgaria. Abstracts, 9:31785 (R;BU)
Minnesota Dept. of Energy, Planning and Development, St. Paul (USA)
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Minnesota Univ., St. Paul (USA). Coll. of Forestry
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Storing solar energy with liquid phase Diels-Alder reactions. Final report, 9:30974 (R;US)
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National Academy of Sciences - National Research Council, Washington, DC (USA)
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National Bureau of Standards, Washington, DC (USA)
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Observation of energy level shifts of Rydberg atoms due to thermal fields. Final report, 9:31957 (R;US)
National Center for Devices and Radiological Health, Rockville, MD (USA)
Annual report of the Division of Risk Assessment (formerly Division of Biological Effects) National Center for Devices and Radiological Health, fiscal year 1982, October 1, 1981-September 30, 1982, 9:31819 (R;US)
National Inst. for Metallurgy, Johannesburg (South Africa)
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National Inst. for Occupational Safety and Health, Cincinnati, OH (USA)
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National Inst. for Occupational Safety and Health, Cincinnati, OH (USA). Div. of Physical Sciences and Engineering
Occupational health control technology for the primary aluminum industry. Technical report, 9:31657 (R;US)
National Inst. for Occupational Safety and Health, Morgantown, WV (USA)
Health hazard evaluation determination report No. MHETA-82-118-9005, Amax coal company, Gillette, Wyoming, 9:31655 (R;US)
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Health hazard evaluation determination report No. MHETA-81-108-9006, Consolidation Coal Company, central machine shop 20, Cadiz, Ohio, 9:30223 (R;US)
National Oceanic and Atmospheric Administration, Princeton, NJ (USA). Geophysical Fluid Dynamics Lab.
Geophysical fluid dynamics laboratory activities - FY83, plans - FY84, 9:31833 (R;US)
National Radiological Protection Board, Harwell (UK)
Study of chromosome aberration yield in human lymphocytes as an indicator of radiation dose. VI. A review of cases investigated, 1975, 9:31791 (R;GB)
National Research Council of Canada, Ottawa, Ontario
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National Research Council, Washington, DC (USA). Board on Science and Technology for International Development
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National Research Council, Washington, DC (USA). Commission on Engineering and Technical Systems
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National Rural Electric Cooperative Association, Washington, DC (USA)
Use of geothermal energy for electric power generation. Workshop proceedings, 9:30589 (R;US)
Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)
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Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)
Reports of 2. All union conference on technological problems of thermonuclear reactors. Volume 2, 9:32357 (R;SU;RU)
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Extreme ultraviolet spectra of highly ionized Ge, Kr and Mo emitted by imploding plasmas, 9:32345 (R;US)
Studies of hydrogenated amorphous silicon. Yearly report, 15 August 1982-15 March 1984, 9:30509 (R;US)
Naval Research Lab., Washington, DC (USA). E.O. Hulburt Center for Space Research
Measurements of high resolution spectra on the Omega laser at Rochester University. FY 82 annual report, 9:32343 (R;US)
Naval Weapons Center, China Lake, CA (USA)
Conversion of organic wastes to unleaded, high-octane gasoline, 9:30472 (R;US)
NCB (IEA Grimethorpe) Ltd., Grimethorpe, Barnsley, South Yorkshire (UK)
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Nevada Univ., Las Vegas (USA). Div. of Earth Sciences
Drilling and thermal gradient measurements at US Marine Corps Air Ground Combat Center, Twentynine Palms, California. Final report, October 1, 1983-March 31, 1984, 9:30583 (R;US)
New Mexico Univ., Albuquerque (USA). Dept. of Electrical Engineering and Computer Science
Variable-speed constant-voltage constant-frequency alternator. Final report, 9:31382 (R;US)
New York Univ., NY (USA). Courant Inst. of Mathematical Sciences
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New Zealand Energy Research and Development Committee, Auckland
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Norges Vassdrags- og Elektrisitetsvesen, Oslo. Elektrisitetstilsynet
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North Carolina State Univ., Raleigh (USA)
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North Dakota Univ., Grand Forks (USA)
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North Dakota Univ., Grand Forks (USA). Energy Research Center
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Use of treated gasification wastewater in a pilot cooling tower. Phase I. Final report for the period ending January 31, 1984, 9:30116 (R;US)
Northeastern Univ., Boston, MA (USA). Coll. of Business Administration
Regional load-curve models. Volume 5. Data base. Final report, 9:31034 (R;US)
Northeastern Univ., Boston, MA (USA). Dept. of Physics
New particle searches at PEP, 9:31999 (R;US)
Northwestern Univ., Evanston, IL (USA). Dept. of Civil Engineering
Assessment of turbine-casing impact code calculations. Final report, 9:30870 (R;US)
NOXSO Corp., Paducah, KY (USA)
Evaluation of the NOXSO combined NO/sub x//SO_2 flue gas treatment process: process chemistry, reaction kinetics, sorbent performance, process design and cost analysis. Final report, 9:30171 (R;US)
Nuclear Fuel Complex, Hyderabad (India). Control Lab.
Preliminary study on the determination of boron and cadmium impurities in uranium oxide and uranium metals by inductively coupled plasma-atomic emission spectroscopy, 9:31289 (R;US)
Nuclear Regulatory Commission, Washington, DC (USA). Div. of Engineering Technology
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Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research
NRC nuclear waste geochemistry 1983, 9:30345 (R;US)
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Office of Naval Research (USA). London Branch Office
European scientific notes. Volume 38. Number 1. Monthly publication, 9:32402 (R;US)
Ohio State Univ., Columbus (USA). Dept. of Microbiology
Development of an in vivo assay for mistranslation: Inducing activity of pollutants and characterization of amino acid substitutions. Annual scientific report, 1 August 82-31 July 83, 9:31727 (R;US)
Oklahoma Geological Survey, Norman (USA)
Tar-sand potential of selected areas in Carter and Murray Counties, South-Central Oklahoma, 9:30264 (R;US)
Oklahoma Univ., Norman (USA). School of Chemical Engineering and Materials Science
Thermophysical properties correlations and pseudocomponent characterization parameter estimation for fossil fluids. Third quarterly report, March 1, 1984-May 31, 1984, 9:30141 (R;US)
Oklahoma Univ., Norman (USA). Science and Public Policy Program
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Reactor safety research programs. Quarterly report, October-December 1983. Vol. 4, 9:30931 (R;US)
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Paris-6 Univ., 75 (France)
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Paris-13 Univ., 93 - Villetaneuse (France). Dept. de Mathematiques
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Peat, Marwick, Mitchell and Co., Washington, DC (USA)
Federal, state and local responses to 1979 fuel shortages, 9:31080 (R;US)
PEDCO-Environmental Specialists, Inc., Cincinnati, OH (USA)
Acid rain: commentary on controversial issues and observations on the role of fuel burning, 9:30179 (R;US)
Pennsylvania State Univ., University Park (USA). Inst. for Research on Land and Water Resources
Feasibility of using municipal wastewater and waste heat to maximize biomass production in energy plantations. Annual progress report, May 15, 1978-March 1, 1981, 9:30510 (R;US)
Pennsylvania Univ., Philadelphia (USA)
Neutron diffraction and the decomposition of membrane scattering profiles into the scattering profiles of their molecular components, 9:31733 (R;US)
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Phillips Petroleum Co., Idaho Falls, ID (USA). Atomic Energy Div.
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Physics International Co., San Leandro, CA (USA)
High pressure tokamak fuel injector. Phase II. Final report, December 1977-December 1979, 9:32362 (R;US)
Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering
Site activities of zeolite-support Ru for CO hydrogenation. Final report, 9:30457 (R;US)
Thermodynamic behavior of coal liquids in the presence of coal solids characterization of IOM and ASH. Third quarterly progress report, February 1, 1984-May 1, 1984, 9:30140 (R;US)
Poitiers Univ., 86 (France)
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Poly Solar, Inc., Garland, TX (USA)
Thin-film indium phosphide photovoltaic device research and development. Final report, 9:30511 (R;US)
Polytechnic Inst. of New York, Brooklyn (USA). Transportation Training and Research Center
Transportation during the next energy crisis: the special problems of small urban areas. Final report, 9:31074 (R;US)
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Final progress report on the Electric Vehicle Project, 9:31137 (R;US)
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Modeling and valuation of utility investments. Final report, 9:31040 (R;US)
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Thermal and radiative properties of coal-ash deposits. Technical progress report No. 10, March 1-May 31, 1984, 9:30160 (R;US)
Pyros, Inc., Gaithersburg, MD (USA)
Appraisal and analysis of opportunities for a joint DOE/DOD energy demonstration program. Final report, 9:31022 (R;US)

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Radian Corp., Austin, TX (USA)
Process gas chromatography study of a Selexol acid gas removal system. Final report Mar-Sep 82, 9:30151 (R;US)
Use of treated gasification wastewater in a pilot cooling tower. Phase I. Final report for the period ending January 31, 1984, 9:30116 (R;US)
Radian Corp., Salt Lake City, UT (USA)
Control technology assessment of petroleum refinery operations: indepth site visit report, Sigmor Three Rivers Refinery, 9:30237 (R;US)
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Industrial response to time-of-use rates: quantitative analysis of French, English and Welsh data. Final report, 9:31037 (R;US)
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Solid state SPS microwave generation and transmission study. Volume II. Phase II final report, appendices, 9:30527 (R;US)
Research Inst. of Colorado, Fort Collins (USA)
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Properties of polymers: some uses in electronics. Part One, 9:31245 (TG;US)
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Risoe National Lab., Roskilde (Denmark)
Agricultural Department annual report 1982, 9:31748 (R;DK)
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Physics Department annual progress report 1 January - 31 December 1982, 9:32399 (R;DK)
R.I.T. Research Corp., Rochester, NY (USA)
Augmented heat transfer rates in utility condensers. Final report, 9:31416 (R;US)
Rochester Univ., NY (USA). Lab. for Laser Energetics
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Preliminary conceptual design of Siriu, A symmetric illumination, direct drive laser fusion reactor. Final report August 8, 1983-June 1, 1984, 9:32349 (R;US)
Rochester Univ., NY (USA). Medical Center
Acute toxicity of the hydrolysis products of uranium hexafluoride (UF_6) when inhaled by the rat and guinea pig. Final report, 9:31808 (R;US)
Rockwell International Corp., Canoga Park, CA (USA). Energy Technology Engineering Center
10 MWe solar thermal central receiver pilot plant operational testing plan, 9:30533 (R;US)
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Early detection and protection measures, 9:30222 (R;DE;In German)
Rutherford Appleton Lab., Chilton (UK)
Annual report to the Laser Facility Committee 1983, 9:31409 (R;GB)
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Samkjoeringen av Kraftverkene i Norge, Trondheim
Power pool in Norway. Annual report 1982, 9:30688 (R;NO;In Norwegian)
San Bernardino Municipal Water Dept., CA (USA)
Feasibility of geothermal direct use applications in San Bernardino, California. Final report, 9:30592 (R;US)
Sandia National Labs., Albuquerque, NM (USA)
1982 Subseabed Disposal Program: geotechnical laboratory and modeling studies. Annual report, October 1981-September 1982, 9:30351 (R;US)
1982 subseabed disposal program annual report. Thermal response studies, October 1981 through September 1982, 9:30352 (R;US)
Advanced reactor safety research quarterly report, October-December 1982. Volume 24, 9:30930 (R;US)
Analysis of a 1:8 scale steel containment model subject to internal static pressurization, 9:30952 (R;US)
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Boolean computation of optimum hitting sets, 9:32419 (R;US)
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Circulation modeling for seabed disposal of nuclear wastes: status, progress and intercomparisons. Report of the interim meeting of the Seabed Working Group Physical Oceanography

Task Group, Cambridge, U.K., 31 August-3 September 1982, 9:30354 (R;US)
Containment analysis techniques: a state-of-the-art summary. Final report, 9:30937 (R;US)
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Sandia technology. Vol. 8, No. 1, 9:31363 (R;US)
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Thermal/hydraulic analysis research program quarterly report, October-December 1983. Volume 4, 9:30932 (R;US)
Two-region vapor generation rate model for convective film boiling, 9:30951 (R;US)

Sandia National Labs., Livermore, CA (USA)
IEA/SSPS - CRS Workshop, April 1983. Executive summary, 9:30530 (R;US)
Mechanical device for enhancing halo density in the TMX-U tandem mirror, 9:32322 (R;US)

San Francisco State Univ., Tiburon, CA (USA). Tiburon Center for Environmental Studies
Ecology of San Francisco Bay tidal marshes: a community profile, 9:31700 (R;US)

Sargent and Lundy, Chicago, IL (USA)
Reactor coolant high-temperature filtration. Volume 4. Engineering details of the Byron nuclear station high-temperature filtration facility. Final report, 9:30720 (R;US)

Sargent Industries, Inc., Red Wing, MN (USA). Central Research Labs. Div.
State-of-the-art Model M-2 Maintenance System, 9:30293 (R;US)

SAS of Texas Ltd., Austin (USA)
Survey of commercial non-nuclear security programs. Final report, 9:30405 (R;US)

Science Applications, Inc., Boulder, CO (USA). Plasma Research Inst.
Generalized gyrokinetics, 9:32319 (R;US)
Particle loss rates from electrostatic wells of arbitrary mirror ratios, 9:32320 (R;US)

Science Applications, Inc., Oak Ridge, TN (USA)
Laboratory extraction method to simulate co-disposal of solid wastes in municipal waste landfills, 9:31684 (R;US)

Science Applications, Inc., Palo Alto, CA (USA)
Transient thermal mixing in a full-height PWR cold leg and downcomer. Final report, 9:30872 (R;US)

Science Applications, Inc., San Leandro, CA (USA)
Assessment of turbine-casing impact code calculations. Final report, 9:30870 (R;US)

Scientific and Technical Studies, London (UK)
Rutherford Appleton Laboratory symposium on new techniques in x-ray and xuv optics, 29th-30th July 1982, Abingdon, 9:31628 (R;GB)

Scientific Design Co., Inc., New York (USA)
Great Plains ASPEN model development. Technical progress report, April 1-April 30, 1984, 9:30118 (R;US)

Shiga Prefecture Water Administration Dept., Otsu (Japan)
Water quality preservation measures in Lake Biwa, the largest lake in Japan, 9:31697 (R;US)

Shoshone Irrigation District, Powell, WY (USA)
Garland canal power project. Final technical and construction cost report, 9:30492 (R;US)

SIAM Inst. for Mathematics and Society, Philadelphia, PA (USA)
Atomic bomb survivor data: utilization and analysis, 9:31765 (R;US)

Smithsonian Astrophysical Observatory, Cambridge, MA (USA)
Experimental studies in molecular fragmentation: processes, energetics and diagnostics. Annual report No. 1, 1 Jan-31 Dec 83, 9:31326 (R;US)

Solar Energy Research Inst., Golden, CO (USA)
SERI Biomass Program. FY 1983 annual report, 9:30473 (R;US)
SERI photovoltaics advanced research and development: FY 1983 accomplishments, 9:30515 (R;US)
Solar energy: a brief assessment, 9:30549 (R;US)
Wind energy: a brief assessment, 9:30595 (R;US)

Solv-Ex Corp., Albuquerque, NM (USA)
Santa Rosa Oil Sands Project. Final technical report, 9:30270 (R;US)

Southern Illinois Univ., Carbondale (USA). Dept. of Thermal and Environmental Engineering
Gasification reactivities of coal and coal char. Project progress report, July 16, 1982-May 31, 1984, 9:30136 (R;US)

South Street Design, Philadelphia, PA (USA)
Sunearth uni-directional damper. Final report, 9:30551 (R;US)

Spanner Engineering, Richland, WA (USA)
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State Univ. of New York, Buffalo (USA). Dept. of Electrical and Computer Engineering
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State Univ. of New York, Stony Brook (USA). Dept. of Chemistry
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Stichting Energieonderzoek Centrum Nederland, Petten
Electrical performance of the 'Pionier I' 15 m VAWT, 9:30599 (R;NL)

Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten
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Stoller (S.M.) Corp., Boulder, CO (USA)
Nuclear unit operating experience: 1980 through 1982 update. Final report, 9:31012 (R;US)

Stoller (S.M.) Corp., New York (USA)
Comparison of advanced BWR fuel designs with current standard designs. Final report, 9:30700 (R;US)

Stone and Webster Engineering Corp., Boston, MA (USA)
Evaluation of regulatory processes affecting nuclear power plant early site approval and standardization, 9:30832 (R;US)
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Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires
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Structural Mechanics Associates, Inc., Newport Beach, CA (USA)
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Engineering characterization of ground motion. Task I. Effects of characteristics of free-field motion on structural response, 9:31832 (R;US)

Structural Mechanics Associates, San Ramon, CA (USA)
Uncertainty in soil-structure interaction analysis of a nuclear power plant due to different analytical techniques, 9:30956 (R;US)

Stuttgart Univ. (Germany, F.R.). Fakultaet 12 - Physik
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Sunburst Recovery, Inc., Steamboat Springs, CO (USA)
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Synergic Resources Corp., Bala-Cynwyd, PA (USA)
Selected statistical methods for analysis of load research data. Final report, 9:31036 (R;US)

Synergic Resources Corp., Monroeville, PA (USA)
1983 survey of utility end-use projects. Final report, 9:31108 (R;US)

Systematics General Corp., Falls Church, VA (USA)
Survey of small and small disadvantaged businesses in solar technology. Final report, 9:30507 (R;US)

Systems and Applied Sciences Corp., Riverdale, MD (USA)
Energy conservation in meat, poultry, and dairy processing. Final report: development of a proposed conference series, 9:31086 (R;US)

T

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Technische Hochschule Darmstadt (Germany, F.R.). Fachbereich Physik
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Technische Univ. Braunschweig (Germany, F.R.). Naturwissenschaftliche Fakultaet
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Technische Univ. Clausthal, Clausthal-Zellerfeld (Germany, F.R.). Fakultaet fuer Bergbau, Huettenwesen und Maschinenwesen
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Technische Univ., Graz (Austria)
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Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet fuer Physik
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Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Elektrotechnik
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Technische Univ., Vienna (Austria)
Tomographic determination of the energy-density-distribution in an electron beam used for machining, 9:31908 (R;AT;In German)

Technische Univ., Vienna (Austria). Inst. fuer Allgemeine Physik
3S'83 Symposium on surface science. Contributions, 9:31905 (R;AT)

Technology for Energy Corp., Knoxville, TN (USA)
Core phenomenology. TEC report on CRBRP PRA Phase II, Task 6C. Final draft report, Revision 1, 9:30862 (R;US)

Teknologistyrelsen, Copenhagen (Denmark). Formidlingsraadet
Norwegian-Danish offshore 82. Report, 9:30260 (R;DK;In Norwegian)

Tennessee Univ., Knoxville (USA)
Negative ion formation in SF_6 spark by-products, 9:31237 (R;US)

Tennessee Univ., Knoxville (USA). Dept. of Physics
Production and destruction of metastable negative ions. Progress report, September 1, 1983-August 31, 1984, 9:31874 (R;US)

Tennessee Valley Authority, Chattanooga (USA). Div. of Air and Water Resources
Water quality management plan for Cherokee Reservoir, 9:31722 (R;US)

Tennessee Valley Authority, Chattanooga (USA). Div. of Energy Conservation and Rates
Wood-fired boiler test report (stick burner), 9:30488 (R;US)
Tennessee Valley Authority, Chattanooga (USA). Office of Power
Coal-fired plants project retirement plan. Supplement, 9:30650 (R;US)
Texaco, Inc., Montebello, CA (USA). Montebello Research Lab.
Type I evaluation of Exxon Donor Solvent (EDS) liquefaction process residue from Texas lignite as a feedstock for the Texaco Gasification Process, 9:30103 (R;US)
Texas A and M Univ., College Station (USA). Center for Energy and Mineral Resources
Economic feasibility of small-scale ethanol production in Texas, 9:30482 (R;US)
Texas A and M Univ., College Station (USA). Dept. of Chemistry
Investigations on multiphoton ionization and fast-beam photodissociation spectroscopy. Progress report, 9:31328 (R;US)
Texas A and M Univ., College Station (USA). Dept. of Physics
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USDOE Office of Civilian Radioactive Waste Management, Washington, DC
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Preparation of super-clean coal. Technical progress report for first and second quarters, September 15, 1983-March 14, 1984, 9:30214 (R;US)

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West Virginia Univ., Morgantown (USA). Dept. of Mineral Resource Economics
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The notations in the final parentheses indicate the type of document, e.g., R for Report; the country of publication, e.g., US; and the language if other than English, e.g., In German. Tables of document types and country of publication codes appear after the indexes.

The title may be supplemented with additional words, or a phrase, if it appears additional information would be helpful. In cases for which the title contains little or no information related to the subject entry, it may be replaced entirely by the supplementary information. A qualifier is not always required, and in such cases the title will follow the unqualified subject descriptor.

The descriptors selected for use as subject terms are generally the names of specific materials, things, or processes. To the extent possible, a qualifier is selected to describe the properties of, or processes applied to, the subject term.

Index entries are selected to indicate the important ideas and concepts presented in a document, rather than words that may appear in the text. Within the available thesaurus terms, the most probable or logical place to look for typical information is selected. "See references" are included to guide users from synonymous terms or phrases to the descriptor selected as a subject heading for the concept. (e.g. Pipeline Quality Gas see HIGH BTU GAS). "See also references" are used to indicate where to find references to subject concepts that are narrower, broader, or related to a particular subject heading. To complete an exhaustive search of a given subject, all such headings should be reviewed. Copies of DOE/TIC-7000, the Subject Thesaurus, are available from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, VA 22161.

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Advanced reactor safety research quarterly report, October-December 1982. Volume 24, 9:30930 (R;US)
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Core phenomenology. TEC report on CRBRP PRA Phase II, Task 6C. Final draft report, Revision 1, 9:30862 (R;US)

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Prior to 1978, known as RISOE RESEARCH ESTABLISHMENT and documents written before that date should be so indexed.
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	9:30540	DOE/SF/10539—18
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	9:31107	DOE/SF/11724—T1
AC03-83SF11956	**Nevada Univ., Las Vegas (USA). Div. of Earth Sciences**	
	9:30583	DOE/SF/11956—1
AC04-76DP00053	**Monsanto Research Corp., Miamisburg, OH (USA). Mound**	
	9:30404	MLM—3155(OP)
	9:31292	MLM—3148(OP)
	9:31637	MLM—3153(OP)
	9:31638	MLM—3154(OP)
AC04-76DP00487	**Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX (USA)**	
	9:31636	MHSMP—84-19
AC04-76DP00656	**General Electric Co., St. Petersburg, FL (USA). Neutron Devices Dept.**	
	9:32312	GEPP-TIS—802
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (USA)**	
	9:30152	SAND—84-0607
	9:30254	SPEJ, Society of Petroleum Engineers Journal 23 NO. 6. 919-927 (Dec 1983).
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (USA)**	
	9:30258	SAND—84-0908
	9:30259	SAND—84-0169-Vol.8-No.1(May 1984).
	9:30271	SAND—84-1088C
	9:30351	SAND—82-2714
	9:30352	SAND—82-2717
	9:30353	SAND—83-1166
	9:30354	SAND—83-1808
	9:30355	SAND—83-2037

Contract No.	Abstract No.	Report No.
	9:30356	SAND—83-2122
	9:30357	SAND—83-2507
	Mitre Corp., McLean, VA (USA). METREK Div.	
	9:30358	SAND—83-7131
	Sandia National Labs., Albuquerque, NM (USA)	
	9:30359	SAND—84-0986C
	9:30440	SAND—83-1054
	9:30514	SAND—84-0579C
	9:30519	Journal of the Electrochemical Society 130 NO. 11. 2225-2230 (Nov 1983).
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (USA)**	
	9:30605	SAND—84-0924C
	Stone and Webster Engineering Corp., Boston, MA (USA)	
	9:30832	ALO—1022
	Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research	
	9:30917	NUREG/CP—0048-Vol.6(Jan 1984).
	9:30919	NUREG/CP—0048-Vol.6(Jan 1984).
	Sandia National Labs., Albuquerque, NM (USA)	
	9:30930	NUREG/CR—2679-Vol.24
	9:30932	NUREG/CR—3329-Vol.4
	9:30934	NUREG/CR—3547
	9:30935	NUREG/CR—3608
	9:30937	NUREG/CR—3653
	9:30939	NUREG/CR—3673
	9:30940	NUREG/CR—3684
	9:30946	SAND—83-2677C
	9:30947	SAND—84-0171C
	9:30948	SAND—84-0805C
	9:30949	SAND—84-0904C
	9:30950	SAND—84-1039C
	9:30951	SAND—84-1040C
	9:30952	SAND—84-1095C
	9:30953	SAND—84-1166C
	9:30981	SAND—84-0716C
	Battelle Columbus Labs., OH (USA)	
	9:30982	SAND—84-7105
	9:31215	Metallurgical Transactions, [Section] A: Physical Metallurgy and Materials Science 14A NO.
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (USA)**	
	9:31232	SAND—83-1949C
	9:31239	SAND—83-2573
	9:31266	SAND—84-0724C
	9:31315	SAND—84-1173C
	9:31363	SAND—84-0169-Vol.8-No.1
	9:31364	SAND—84-0169-Vol.8-No.1(May 1984).
	9:31399	SAND—84-1127C
	9:31425	SAND—84-0064C
	9:31426	SAND—84-0565C
	North Carolina State Univ., Raleigh (USA)	
	9:31433	SAND—84-7120C
	Sandia National Labs., Albuquerque, NM (USA)	
	9:31495	SAND—84-0095C
	9:31613	SAND—84-0378C
	9:32250	SAND—84-0570
	9:32252	Physical Review [Section] B: Condensed Matter 29 NO. 5. 2790-2792 (1 Mar 1984).
AC04-76DP00789	**Sandia National Labs., Albuquerque, NM (USA)**	
	9:32321	SAND—83-2641C
	9:32365	SAND—83-2614C
	9:32383	SAND—84-0169-Vol.8-No.1(May 1984).
	9:32418	SAND—84-0293
	9:32419	SAND—84-0448
	9:32440	SAND—84-1063C

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AC04-76DP03533	**Rockwell International Corp., Golden, CO (USA). Wind Energy Research Center**	
	9:30604	RFP—3564
AC04-76DR00789	**Sandia National Labs., Livermore, CA (USA)**	
	9:30530	CONF-8304133—Exec.Summ.
	9:32322	SAND—83-8236
AC04-76EV01013	**Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM**	
	9:31571	Health Physics 46 NO. 3. 639-646 (Mar 1984).
	9:31816	Environmental Science and Technology 18 NO. 1. 14A-21A (Jan 1984).
AC04-78CS54240	**Energy Systems Research Div. Southwest Research Institute**	
	9:31139	SAE (Society of Automotive Engineers) Special Publication SP-527 101-115 (Oct 1982).
AC04-79CS10510	**Battelle Columbus Laboratories, Columbus, Ohio**	
	9:30572	Proceedings - Electrochemical Society 83-1 289-318 (Oct 1981).
AC05-76ET10143	**Ashland Synthetic Fuels, Inc., KY (USA)**	
	9:30104	DOE/ET/10143—T37-Vol.1
	9:30105	DOE/ET/10143—T37-Vol.2
	9:30106	DOE/ET/10143—T37-Vol.3
	9:30107	DOE/ET/10143—T37-Vol.4
	9:30108	DOE/ET/10143—T37-Vol.5
	9:30109	DOE/ET/10143—T37-Vol.6
	9:30110	DOE/ET/10143—T37-Vol.7
	9:30111	DOE/ET/10143—T37-Vol.8
	9:30112	DOE/ET/10143—T37-Vol.9-10
AC05-76OR00033	**Oak Ridge Associated Universities, Inc., TN (USA)**	
	9:30944	ORAU/IEA—84-2(M)
	9:30945	ORAU/IEA—84-5(M)
	UNISOR, Oak Ridge, TN (USA)	
	9:32107	CONF-840530—1
	9:32153	Physical Review Letters 52 NO. 15. 1272-1275 (9 Apr 1984).
AC05-78OR03054	**International Coal Refining Co., Allentown, PA (USA)**	
	9:30122	DOE/OR/03054—22
	9:30123	DOE/OR/03054—50
	9:30124	DOE/OR/03054—50-App.A-Vol.1
	9:30125	DOE/OR/03054—50-App.A-Vol.3
	9:30126	DOE/OR/03054—50-App.B-Vol.1
	9:30127	DOE/OR/03054—50-App.C
	9:30128	DOE/OR/03054—50-App.D
	9:30129	DOE/OR/03054—50-App.E
	9:30130	DOE/OR/03054—50-App.F
	9:30131	DOE/OR/03054—50-App.G
	Chem-Pro Corp., Fairfield, NJ (USA)	
	9:30132	DOE/OR/03054—87
	International Coal Refining Co., Allentown, PA (USA)	
	9:30133	DOE/OR/03054—89
AC05-79ER10013	**Florida Univ., Gainesville (USA). Dept. of Electrical Engineering**	
	9:31371	CONF-830491—2
	9:31372	CONF-830491—4
	Florida Univ., Gainesville (USA)	
	9:31373	CONF-830491—5
	Florida Univ., Gainesville (USA). Dept. of Electrical Engineering	
	9:31374	CONF-830491—6
	9:31375	CONF-830491—7
	Florida Univ., Gainesville (USA). Center for Intelligent Machines and Robotics	
	9:31378	DOE/ER/10013—1
	9:31379	DOE/ER/10013—2

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	Florida Univ., Gainesville (USA). Dept. of Electrical Engineering	
	9:31380	DOE/ER/10013—T1
	Florida Univ., Gainesville (USA). Center for Intelligent Machines and Robotics	
	9:31381	DOE/ER/10013—T2
AC05-79ET60004	**Decision Focus, Inc., Palo Alto, CA (USA)**	
	9:31024	DOE/ET/60004—T6
AC05-82OR20900	**Massachusetts Inst. of Tech., Cambridge (USA). Dept. of Mathematics**	
	9:30287	UVA-ER—914-84U
AC05-84OR21400	**Oak Ridge National Lab., TN (USA)**	
	9:30099	CONF-840570—5
	9:30102	CONF-8405154—4
	9:30150	ORNL/TM—8916
	9:30169	CONF-8405154—3
	9:30293	CONF-840413—6
	9:30363	ORNL-tr—5123(1984).
	9:30364	ORNL-tr—5122(1984).
	9:30607	CONF-840423—1
	9:30714	CONF-840516—6
	9:30762	CONF-840570—7
	Babcock and Wilcox Co., Alliance, OH (USA). Research and Development Div.	
	9:30813	NUREG/CR—3771
	Oak Ridge National Lab., TN (USA)	
	9:30833	DP-MS—84-49
	9:30852	ORNL/TM—9174
	9:31054	CONF-840518—1
	9:31145	CONF-8404148—1
	9:31146	CONF-8404150—1
	9:31220	CONF-830573—11
	9:31223	CONF-8405176—1
	9:31235	ORNL-tr—5117(1984).
	9:31237	CONF-840403—6
	9:31238	CONF-840440—1
	9:31377	CONF-8404158—1
	9:31423	NUREG/CR—3200-Vol.4
	9:31470	CONF-8404143—1
	9:31649	CONF-830587—2
	9:31650	CONF-8305200—1
	9:31651	CONF-8405169—1
	9:31684	CONF-8405174—1
	Environmental Science and Engineering, Inc., Gainesville, FL (USA)	
	9:31696	ORNL/TM—8919
	Oak Ridge National Lab., TN (USA)	
	9:31752	CONF-840512—10
	UNISOR, Oak Ridge, TN (USA)	
	9:32108	CONF-8404157—1
	Oak Ridge National Lab., TN (USA)	
	9:32253	CONF-840512—9
	Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)	
	9:32299	CONF-840520—3
	Oak Ridge National Lab., TN (USA)	
	9:32300	CONF-8405170—1
	9:32336	ORNL-tr—5128(1983).
	9:32337	ORNL-tr—5127(1983).
	9:32338	ORNL-tr—5129(1983).
	Bochum Univ. (Germany, F.R.). Abt. fuer Physik und Astronomie	
	9:32339	ORNL-tr—5115(1980).
	Oak Ridge National Lab., TN (USA)	
	9:32340	CONF-840476—1
	9:32353	DOE/OR/21400—T7
	9:32385	ORNL-tr—5118(1984).
	9:32390	ORNL-tr—5126(1983).
	9:32406	CONF-8405171—1
	9:32407	CONF-8405173—1
	Rice Univ., Houston, TX (USA)	
	9:32408	CONF-8405175—1
AC05-84OT21400	**Oak Ridge Gaseous Diffusion Plant, TN (USA)**	
	9:30399	K/OA—5643
	Rochester Univ., NY (USA). Medical Center	
	9:31808	K/SUB—81-9039/3
AC06-76FF02170	**Hanford Engineering Development Lab., Richland, WA (USA)**	
	9:30703	HEDL—7448
	9:30704	HEDL—7449
	9:30765	HEDL-SA—3054-FP
	9:30847	HEDL-SA—3066-FP
	9:30873	HEDL-SA—3055
	9:31149	HEDL—7405
	9:31386	HEDL-SA—3014FP
	9:31387	HEDL-SA—3077-FP
AC06-76RL01830	**Stone and Webster Engineering Corp., Boston, MA (USA)**	
	9:30313	BMI/SRP—5006
	9:30314	BMI/SRP—5008
	9:30315	BMI/SRP—5009
	Pacific Northwest Lab., Richland, WA (USA)	
	9:30323	DOE/UMT—0217
	9:30350	PNL—5108
	9:30387	NUREG/CR—3797
	9:30478	Alternative Energy Sources 3 347-356 (Dec 1980).
	9:30479	Alternative Energy Sources 3 363-376 (Dec 1980).
	9:30506	PNL-SA—12261
	General Electric Co., Schenectady, NY (USA). Corporate Research and Development Dept.	
	9:30586	PNL—3857
	Pacific Northwest Lab., Richland, WA (USA)	
	9:30598	DOE/RL/01830—T18
	9:30602	PNL—4895
	9:30603	PNL—5024
	9:30606	Alternative Energy Sources 4 3-20 (Dec 1980).
	Battelle Human Affairs Research Center, Seattle, WA (USA)	
	9:30692	NUREG/CR—3726
	Pacific Northwest Lab., Richland, WA (USA)	
	9:30812	NUREG/CR—3743
	Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research	
	9:30927	NUREG/CP—0048-Vol.6(Jan 1984).
	Pacific Northwest Lab., Richland, WA (USA)	
	9:30931	NUREG/CR—3307-Vol.4
	9:30938	NUREG/CR—3669
	9:30942	NUREG/CR—3749
	9:30943	NUREG/CR—3785
	9:31093	PNL—5008
	9:31398	PNL-SA—4868-Rev.5
	9:31419	PNL-SA—12197
	9:31424	PNL-SA—12192
	Environmental Films, Inc., St. Johnsbury, VT (USA)	
	9:31644	NUREG/CR—3670
	Pacific Northwest Lab., Richland, WA (USA)	
	9:31661	PNL—4869
	9:31676	PNL-SA—11792
	9:31796	Health Physics 46 NO. 3. 657-663 (Mar 1984).
	9:31814	PNL-SA—11833
	9:31958	PNL-SA—11768
AC06-76RL01857	**UNC Nuclear Industries, Inc., Richland, WA (USA). Office of Surplus Facilities Management**	
	9:30853	UNI—2619
AC06-77RL01030	**Rockwell Hanford Operations P.O. Box 800, Richland, Washington 99352**	
	9:30368	Nuclear Technology 59 NO. 3. 390-404 (Dec 1982).
AC07-76GJ01664	**Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations**	
	9:30279	GJBX—40(83)
AC07-76ID01570	**EG and G Idaho, Inc., Idaho Falls (USA)**	
	9:30325	EGG-M—19183
	9:30326	EGG-WM—6627
	9:30389	EGG-M—04684
	9:30396	EGG-M—18283

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	9:30575	DOE/ID/01570—T62
	Idaho National Engineering Lab., Idaho Falls (USA)	
	9:30590	EGG-M—03884
	EG and G Idaho, Inc., Idaho Falls (USA)	
	9:30763	EGG-M—13383
	9:30764	EGG-M—13583
	9:30797	NUREG/CR—3360
	9:30824	EGG-M—08784
	9:30825	EGG-M—25983
	9:30846	EGG-M—03984
	9:30864	EGG-M—06284
	Idaho National Engineering Lab., Idaho Falls (USA)	
	9:30865	EGG-M—06384
	EG and G Idaho, Inc., Idaho Falls (USA)	
	9:30866	EGG-M—06484
	EG and G Idaho, Inc., Idaho Falls (USA). Water Reactor Research Dept.	
	9:30867	EGG-M—06684
	9:30868	EGG-M—06784
	EG and G Idaho, Inc., Idaho Falls (USA)	
	9:30869	EGG-M—17883
	Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Regulatory Research	
	9:30895	NUREG/CP—0048-Vol.1(Jan 1984).
	9:30921	NUREG/CP—0048-Vol.6(Jan 1984).
	EG and G Idaho, Inc., Idaho Falls (USA)	
	9:30941	NUREG/CR—3722
	9:31087	EGG-M—04584
	Heist Engineering Corp., Walnut Creek, CA (USA)	
	9:31088	EGG-M—10084
	EG and G Idaho, Inc., Idaho Falls (USA)	
	9:31089	EGG-M—15583
	9:31106	DOE/ID/01570—T61
	9:31148	EGG-SCM—6577
	9:31334	EGG-TMI—6489
	9:31367	EGG-M—08584
	9:31420	EGG-M—05283
	9:31421	EGG-M—11684
	Idaho National Engineering Lab., Idaho Falls (USA)	
	9:31533	EGG-M—27182
	EG and G Idaho, Inc., Idaho Falls (USA)	
	9:32396	EGG-M—01284
	9:32397	EGG-M—01784
	9:32409	EGG-M—06084
AC07-79ET27014	**Washington Div. of Geology and Earth Resources, Olympia (USA)**	
	9:30577	DOE/ET/27014—T12
	9:30578	DOE/ET/27014—T13
	9:30579	DOE/ET/27014—T17
AC07-79ID12079	**Utah Univ., Salt Lake City (USA)**	
	9:30582	DOE/ID/12079—90
AC07-81ID12295	**GA Technologies, Inc., San Diego, CA (USA)**	
	9:31090	GA-A—17334
AC08-80DP40124	**Rochester Univ., NY (USA). Lab. for Laser Energetics**	
	9:32301	DOE/DP/40124—32
	9:32302	DOE/DP/40124—36
	9:32303	DOE/DP/40124—38
	9:32332	Physical Review Letters 52 NO. 17. 1496-1499 (23 Apr 1984).
	9:32346	DOE/DP/40124—34
	9:32347	DOE/DP/40124—37
AC08-82DP40152	**KMS Fusion, Inc., P.O. Box 1567, Ann Arbor, Michigan 48106**	
	9:31633	Applied Optics 23 NO. 1. 176-179 (1 Jan 1984).
AC09-76SR00001	**Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.**	
	9:30294	DP—1680
	9:30324	DPST—82-472
	9:30369	Nuclear Technology 59 NO. 2. 314-320 (Nov 1982).

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	URS/John A. Blume and Associates, Engineers, San Francisco, CA (USA)	
	9:30850	DOE/SR/00001—T23
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant	
	9:31707	DP-MS—84-35
AC09-79ET41900	**The Pennsylvania State University, Materials Research Laboratory, University Park, Pennsylvania 1680**	
	9:30382	Nuclear Technology 56 NO. 2. 289-296 (Feb 1982).
AC15-83CL01819	**Technology for Energy Corp., Knoxville, TN (USA)**	
	9:30862	DOE/CL/01819—T3
AC19-79BC10083	**Houston Univ., TX (USA)**	
	9:30227	DOE/BC/10083—19
AC21-80ET15492	**Air Pollution Technology, Inc., San Diego, CA (USA)**	
	9:30170	DOE/ET/15492—T53
AC21-81MC16014	**Massachusetts Inst. of Tech., Cambridge (USA). Energy Lab.**	
	9:30216	DOE/MC/16014—1573
AC21-82MC19163	**Scientific Design Co., Inc., New York (USA)**	
	9:30118	DOE/MC/19163—T21
AC21-82MC19207	**Massachusetts Inst. of Tech., Cambridge (USA)**	
	9:30119	DOE/MC/19207—1614
AC21-83MC20013	**Holder (Gerald), Morgantown, WV (USA)**	
	9:30262	DOE/MC/20013—T4
AC21-83MC20212	**Institute of Gas Technology, Chicago, IL (USA)**	
	9:31046	DOE/MC/20212—1570
AC21-83MC20342	**Institute of Gas Technology, Chicago, IL (USA)**	
	9:30253	DOE/MC/20342—1615
AC22-76ET10532	**Chevron Research Co., Richmond, CA (USA)**	
	9:30113	DOE/ET/10532—T18
AC22-79ET13397	**Auburn Univ., AL (USA). Dept. of Chemical Engineering**	
	9:30114	DOE/ET/13397—20
AC22-80ET15614	**Avco-Everett Research Lab., Inc., Everett, MA (USA)**	
	9:31044	DOE/ET/15614—18
AC22-80PC30295	**Acurex Corp., Mountain View, CA (USA). Energy and Environmental Div.**	
	9:30217	DOE/PC/30295—8
AC22-80PC30320	**Adelphi Research Center, Inc., Garden City, NY (USA)**	
	9:30172	DOE/PC/30320—T4
AC22-81PC40068	**Energy and Environmental Engineering, Inc., Cambridge, MA (USA)**	
	9:30180	DOE/PC/40068—T5-Vol.1
	9:30181	DOE/PC/40068—T5-Vol.2
AC22-82FE60148	**NOXSO Corp., Paducah, KY (USA)**	
	9:30171	DOE/FE/60148—T2
AC22-83PC60019	**Mobil Research and Development Corp., Paulsboro, NJ (USA)**	
	9:30465	DOE/PC/60019—2
AC22-83PC60046	**Gulf South Research Inst., New Orleans, LA (USA)**	
	9:30137	DOE/PC/60046—1
AC22-83PC60577	**TRW Energy Development Group, Redondo Beach, CA (USA)**	
	9:31045	MHD-III—84-045
AC22-83PC63032	**TRW, Inc., Redondo Beach, CA (USA)**	
	9:30142	DOE/PC/63032—T3
AC41-81R110849	**B and M Technological Services, Inc., Boston, MA (USA)**	
	9:31060	DOE/R1/10849—1
AC79-83BP11551	**ECO Northwest (USA)**	
	9:31725	DOE/BP—238
AI01-76ET10393	**NCB (IEA Grimethorpe) Ltd., Grimethorpe, Barnsley, South Yorkshire (UK)**	
	9:31454	DOE/ET/10393—1566
AI01-79CS30077	**BDM Corp., Albuquerque, NM (USA)**	
	9:30523	DOE/CS/30077—T4

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AI01-79CS40289	Chemical Coaters Association, Wheaton, IL (USA)	
	9:31085	DOE/CS/40289—T1
AI01-79ER10035	Alabama Univ., Huntsville (USA). Kenneth E. Johnson Environmental and Energy Center	
	9:30522	CONF-800196—Summ.
	9:30524	DOE/ER/10035—T1
	Raytheon Co., Wayland, MA (USA). Equipment Div.	
	9:30527	NASA/CR—3339
	National Aeronautics and Space Administration, Washington, DC (USA)	
	9:30528	NASA/CR—3345
	Georgia Inst. of Tech., Atlanta (USA). Engineering Experiment Station	
	9:31428	NASA/CR—3372
AI01-81CS90103	Dane County Regional Planning Commission, Madison, WI (USA)	
	9:31078	DOT-I—83-26
AI01-81FE00016	Foster-Miller Associates, Inc., Waltham, MA (USA). Engineering Systems Group	
	9:30199	DOE/FE/00016—T31
AI01-81RA31029	Energy Security Analysis, Washington, DC (USA)	
	9:30243	DOE/RA/31029—T1
AI01-82NE44185	National Research Council, Washington, DC (USA). Commission on Engineering and Technical Systems	
	9:31384	DOE/NE/44185—T1
AI02-80CS83116	Naval Research Lab., Washington, DC (USA)	
	9:30509	DOE/CS/83116—T1
AI05-83ER13114	Department of Agriculture, Washington, DC (USA)	
	9:31729	DOE/ER/13114—1
AI08-78ET44802	Geological Survey, Denver, CO (USA)	
	9:30361	USGS-OFR—83-912
	9:30362	USGS-OFR—84-149
AI08-79DP40092	Naval Research Lab., Washington, DC (USA). E.O. Hulburt Center for Space Research	
	9:32343	DOE/DP/40092—3
	Hulbert (E.O.) Center for Space Research, Washington, DC (USA)	
	9:32344	DOE/DP/40092—4
	Maryland Univ., College Park (USA). Lab. for Plasma and Fusion Energy Studies	
	9:32345	DOE/DP/40092—5
AM01-81AD11151	Faucett (Jack) Associates, Inc., Chevy Chase, MD (USA)	
	9:30153	DOE/AD/11151—1
AS04-76ET33626	New Mexico State Univ., Las Cruces	
	9:31687	Journal of Environmental Quality 13 NO. 2. 297-300 (1984).
AS05-78ET52025	Georgia Inst. of Tech., Atlanta (USA)	
	9:32313	GTFR—46
	9:32314	GTFR—47
	Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering and Health Physics	
	9:32354	GTFR—44
AS05-81ER40039	Texas A and M Univ., College Station (USA). Dept. of Physics	
	9:31981	DOE/ER/40039—T1
AS05-82ER13015	Univ. of Kansas, Lawrence	
	9:31747	Plant Physiology 74 NO. 4. 804-809 (Apr 1984).
AS05-82ER13023	Texas A and M Univ., College Station (USA). Dept. of Chemistry	
	9:31328	DOE/ER/13023—1
AS05-83ER13097	Tennessee Univ., Knoxville (USA). Dept. of Physics	
	9:31874	DOE/ER/13097—1
AS07-77ET28365	Colorado Geological Survey, Denver (USA)	
	9:30580	DOE/ET/28365—21

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AS08-81DP40135	California Univ., Los Angeles (USA). Dept. of Electrical Engineering	
	9:32348	DOE/DP/40135—1
AS08-83DP40185	Wisconsin Univ., Madison (USA). Dept. of Nuclear Engineering	
	9:32349	DOE/DP/40185—1
AS09-80EV10331	Skidaway Institute of Oceanography, Savannah, Georgia 31416	
	9:31860	Journal of Physical Oceanography 14 NO. 1. 193-197 (Jan 1984).
AS20-81LC10694	Colorado School of Mines, Golden (USA). Dept. of Geology	
	9:30117	DOE/LC/10694—1519
AS20-81LC10730	Oklahoma Geological Survey, Norman (USA)	
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AT03-76ER70227	Department of Physics and Institute for Pure and Applied Physical Sciences, University of California	
	9:31268	Physical Review Letters 52 NO. 17. 1563-1566 (23 Apr 1984).
AT03-80ER10684	California Univ., Los Angeles (USA). School of Public Health	
	9:30455	DOE/ER/10684—T2
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	9:30534	DOE/SF/10501—010
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FC07-79ID12026	Wyoming Univ., Laramie (USA). Dept. of Geology and Geophysics	
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	9:30492	DOE/ID/12129—T1
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	9:31137	DOE/NV/10113—1
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FG01-78ET20590	Pennsylvania State Univ., University Park (USA). Inst. for Research on Land and Water Resources	
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	9:30446	CONF-8105169—(1981).
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1.08	NTIS (US Sales Only), PC A10/MF A01	DE84701853	MN -41	9:30388
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	See IWGFPT-3	DE84900850	MN -78	9:30819
CONF-791103-	(American Nuclear Society meeting, San Francisco, CA, USA, 12-16 Nov 1979)			
114-Rev.5	*See* PNL-SA-4868-Rev.5	DE84011547	MN -46	9:31398
CONF-800196-	(SPS space transportation workshop, Huntsville, AL, USA, 29-31 Jan 1980)			
Summ.	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012295	MN -63	9:30522
CONF-8004124-	(12. annual meeting of the Mid-Continent Regional Science Association, Lincoln, NB, USA, 24-26 Apr 1980)			
2	NTIS MF A01; 2 (GPO Dep.)	DE84007609	MN -97	9:31029
CONF-8010341-	(Use of geothermal energy for electric power generation workshop, San Diego, CA, USA, 21-23 Oct 1980)			
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CONF-8011208-	(Uranium in granites workshop, Ottawa, Ontario, Canada, 25-26 Nov 1980)			
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	See EPRI-EL-3415	TI84920355	ND -97a	9:30686
CONF-8105169-	(DOE contractors' conference on indirect liquefaction, Pittsburgh, PA, USA, 20-21 May 1981)			
	NTIS, PC A17/MF A01; 1 (GPO Dep.)	DE84005787	MN -90d	9:30443
CONF-8106209-	(2. all-union conference on engineering problems of thermonuclear reactors, Leningrad, USSR, 23-25 Jun 1981)			
Vol.2	*See* INIS-SU-219	DE84780219	MN -20	9:32357
CONF-8106326-	(Uranium inquiry meeting, Halifax, Nova Scotia, Canada, 22 Jun 1981)			
1	*See* INFO-0082	DE84701906	MN -2	9:30390
CONF-811013-	(Electrochemical Society conference, Denver, CO, USA, 11-16 Oct 1981)			
	Proc. - Electrochem. Soc., 83-1: 167-182(Oct 1981)			9:30567
	Proc. - Electrochem. Soc., 83-1: 183-201(Oct 1981)			9:30568
	Proc. - Electrochem. Soc., 83-1: 223-231(Oct 1981)			9:30569
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	Proc. - Electrochem. Soc., 83-1: 269-288(Oct 1981)			9:30571
	Proc. - Electrochem. Soc., 83-1: 289-318(Oct 1981)			9:30572
	Proc. - Electrochem. Soc., 83-1: 472-491(Oct 1981)			9:30573
	Proc. - Electrochem. Soc., 83-1: 9-16(Oct 1981)			9:30986
	Proc. - Electrochem. Soc., 83-1: 43-49(Oct 1981)			9:30987
	Proc. - Electrochem. Soc., 83-1: 17-26(Oct 1981)			9:31047
	Proc. - Electrochem. Soc., 83-1: 124-139(Oct 1981)			9:31048
	Proc. - Electrochem. Soc., 83-1: 140-158(Oct 1981)			9:31049
CONF-8110314-	(Meeting on prospects of JINR basic installation usage foa biological studies, Dubno, USSR, 28-30 Oct 1981)			
1	*See* JINR-18-82-65	DE84701725	MN -28	9:31509
CONF-8111207-	(EPRI workshop on electrical testing of extruded-dielectric power transmission cables, St. Petersburg, FL, USA, 13-14 Nov 1981)			
	See EPRI-EL-3415	TI84920355	ND -97a	9:30686

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CONF-820192-	(3. working conference on IPHE-JINR neutrino detector, Dubna, USSR, 18-20 Jan 1982)			
	See JINR-R-1-2-13-83-81	DE84780157	MN -34D	9:31557
CONF-820565-	(Conference on resource recovery from solid wastes, Miami Beach, FL, USA, 10-12 May 1982)			
	Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523	TI83005317		9:31109
CONF-820574-	(Workshop on accelerator orbit and particle tracking programs, Upton, NY, USA, 3-6 May 1982)			
5	*See* SLAC-PUB-2925	DE84009710	MN -28	9:31500
CONF-8205251-	(Conference on collective methods acceleration problems, Dubna, USSR, 18-20 May 1982)			
	See JINR-D-9-82-664	DE84780156	MN -28	9:31477
CONF-8205252-	(Meeting on investigations in the field of relativistic nuclear physics, Dubna, USSR, 25-27 May 1982)			
	See JINR-D-2-82-568	DE84780158	MN -34C	9:32065
CONF-8205253-	(3. annual meeting of the Canadian Radiation Protection Association, Vancouver, B.C., Canada, 4 May 1982)			
1	*See* AECL-7760	DE84701840	MN -48	9:31749
CONF-8205254-	(Canadian conference on industrial computers, Hamilton, Ontario, Canada, 3-5 May 1982)			
1	*See* AECL-7681	DE84701870	MN -80	9:30754
CONF-8205262-	(Workshop on continuing actions to reduce losses from earthquakes in the Mississippi Valley area, St. Louis, MO, USA, 24-26 May 1982)			
	See USGS-OFR-83-157	TI84901254	MN -11	9:31823
CONF-820607-	(11. international hot atom chemistry symposium (IHAC), Davis, CA, USA, 27 Jun-2 Jul 1982)			
1	*See* KFKI-1983-91	DE84701707	MN -4	9:31361
CONF-8206240-	(Brookhaven symposium biology 32, Upton, NY, USA, 1-4 Jun 1982)			
4	*See* BNL-34682	DE84012176	MN -48	9:31733
5	*See* BNL-34674	DE84012173	MN -48	9:31728
CONF-8207106-	(Symposium on new techniques in X-ray and XUV optics, Abingdon, UK, 29-30 Jul 1982)			
	See RL-83-010	DE84780163	MN -34	9:31628
CONF-820828-	(9. EPS Nuclear Physics Divisional conference on nuclear structure, Amsterdam, Netherlands, 29 Aug-4 Sep 1982)			
12	*See* TRI-PP-82-39	DE84701825	MN -34C	9:32076
CONF-8208174-	(Technical committee meeting on environmental assessment methodologies for sea dumping of radioactive wastes, Vienna, Austria, 30 Aug-3 Sep 1982)			
	See IAEA-TECDOC-296	DE84701849	MN -41	9:30385
CONF-820917-	(Electron and proton transfer conference, Southampton, UK, 14-16 Sep 1982)			
1	*See* BNL-31346	DE84010363	MN -4	9:31314
CONF-820927-	(57. AIME Society of Petroleum Engineers annual technical conference and exhibition, New Orleans, LA, USA, 26-29 Sep 1982)			
9	*See* LBL-14270	DE84012250	MN -66a	9:30591
CONF-820933-	(International conference on radioactive waste management, Winnipeg, Manitoba, Canada, 12-15 Sep 1982)			
10	*See* INFO-0086	DE84701900	MN -70	9:30391
CONF-8209120-	(IAEA specialists' meeting on power ramping and cycling behaviour of water reactor fuel, Petten, Netherlands, 8-9 Sep 1982)			
Summ.	*See* IWGFPT-14	DE84900986	MN -78	9:30820
CONF-8209165-	(2. working meeting radioisotope application and radiation processing in industry, Leipzig, German D.R., 28 Sep-1 Oct 1982)			
Exc.	*See* Zfl-Mitt-71	DE84780373	MN -23	9:30431
CONF-8209215-	(Meeting of SERC research grant holders in fusion technology, Abingdon, UK, 28-29 Sep 1982)			
	See RL-83-069	DE84780162	MN -25	9:32298
CONF-8209219-	(Advisory group meeting on data acquisition systems in nuclear science and technology, Vienna, Austria, 13 Sep 1982,-17 Sep 1983)			
	See IAEA-TECDOC-280	DE84780374	MN -34C	9:32438
CONF-8209235-	(39. annual meeting of the East Central Section of the Air Pollution Control Association, Cincinnati, OH, USA, 22-24 Sep 1982)			
Absts.	R.G. Ostendor, Procter and Gamble Co., 7162 Reading Road, Cincinnati, Ohio 45222	TI84901073	MN -90i	9:30179
CONF-821011-	(IEEE nuclear science symposium, Washington, DC, USA, 20-22 Oct 1982)			
55	*See* TRI-PP-82-38	DE84701891	MN -37	9:31563
CONF-8210125-	(Conference on the geothermal program review, Washington, DC, USA, 25-26 Oct 1982)			
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CONF-8210133-	(8. All-Union conference on charged particles accelerators, Protvino, USSR, 19-21 Oct 1982)			
5	*See* TRI-PP-82-37	DE84701863	MN -28	9:31518

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CONF-8211147-	(Daresbury study on application of synchrotron radiation to problems in materials science, Daresbury, UK, 13-14 Nov 1982)			
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CONF-821260-	(Active solar air systems workshop, Ottawa, Canada, 8 Dec 1982)			
Summ.	NTIS (US Sales Only), PC A02/MF A01; 1	DE84901075	MN -59a	9:30545
CONF-821267-	(EPRI workshop on planning and assessment of load management, San Antonio, TX, USA, 8-10 Dec 1982)			
	See EPRI-EA-3464	TI84920361	ND -97b	9:31035
CONF-821270-	(3. national meeting of reactor physics, Itaipava, RJ, Brazil, 12-14 Dec 1982)			
	See INIS-BR-95	DE84780120	MN -25	9:30796
CONF-830120-	(Symposium on surface science, Obertraun, Austria, 30 Jan-4 Feb 1983)			
Exc.	*See* INIS-mf-8901	TI84701920	MN -34A	9:31905
CONF-830223-	(Wire chamber conference, Vienna, Austria, 15-18 Feb 1983)			
	Nucl. Instrum. Methods Phys. Res., 217: No. 1/2, 351-356(15 Nov 1983)			9:31594
	Nucl. Instrum. Methods Phys. Res., 217: No. 1/2, 140-148(15 Nov 1983)			9:31595
	Nucl. Instrum. Methods Phys. Res., 217: No. 1/2, 173-180(15 Nov 1983)			9:31596
	Nucl. Instrum. Methods Phys. Res., 217: No. 1/2, 255-258(15 Nov 1983)			9:31597
	Nucl. Instrum. Methods Phys. Res., 217: No. 1/2, 273-276(15 Nov 1983)			9:31598
	Nucl. Instrum. Methods Phys. Res., 217: No. 1/2, 291-297(15 Nov 1983)			9:31599
	Nucl. Instrum. Methods Phys. Res., 217: No. 1/2, 322-326(15 Nov 1983)			9:31600
CONF-8303125-	(2. conference on fabirc filter technology for coal-fired power plants, Denver, CO, USA, 22-24 Mar 1983)			
	See EPRI-CS-3257	TI84920091	ND -90f	9:30653
CONF-8303128-	(Israel Physical Society annual meeting, Ramat-Gan, Israel, 24 Mar 1983)			
Summ.	*See* INIS-mf-8921	DE84780235	MN -34A	9:31861
CONF-830491-	(PCI/MOTORCON 83 conference, Orlando, FL, USA, 19-21 Apr 1983)			
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7	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012881	MN -38	9:31375
CONF-8304133-	(SSPS Central Receiver System (CRS) midterm workshop, Tabernas, Spain, 19-20 Apr 1983)			
Exec.Summ.	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012476	MN -62	9:30530
CONF-8304157-	(Failures and inspections of fossil-fired boiler tubes conference, Bal Harbour, FL, USA, 13-15 Apr 1983)			
	See EPRI-CS-3272	TI84920104	ND -90f	9:30612
CONF-8304176-	(3. international symposium on the science and technology of light sources, Toulouse, France, 18-21 Apr 1983)			
1	*See* LBL-17542	DE84012573	MN -13	9:31818
2	*See* LBL-17394	DE84012572	MN -95d	9:31091
CONF-830523-	(International conference on radioactive waste management, Seattle, WA, USA, 16-20 May 1983)			
Vol.3	*See* STI/PUB-649-Vol.3	TI84012209	ND -70	9:30360
CONF-830573-	(2. international conference on radiation effects in insulators, Albuquerque, NM, USA, 30 May-3 Jun 1983)			
11	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012336	MN -25	9:31220
CONF-830587-	(9. annual research symposium on land disposal, incineration and treatment of hazardous waste, Ft. Mitchell, KY, USA, 2-4 May 1983)			
2	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012338	MN -11	9:31649
CONF-8305119-	(4. Warsaw symposium of elementary particles, Kazimierz, Poland, 30 May-3 Jun 1983)			
4	*See* RL-83-061	DE84701788	MN -34D	9:32023
CONF-8305192-	(Power plant retrofit to district heating and cooling projects and grid-connected integrated community energy systems projects meeting, Washington, DC, USA, 24-25 May 1983)			
	See ANL/CNSV-TM-136	DE84011796	MN -95d	9:31104
CONF-8305196-	(Polarized electron workshop, Stanford, CA, USA, 16-20 May 1983)			
1	*See* DOE/ER/40017-6	DE84011610	MN -28	9:31503
CONF-8305200-	(Symposium on the Southern Appalachian spruce-fir ecosystem: status, threats, and management, Gatlinburg, TN, USA, 1 May 1983)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012350	MN -11	9:31650
CONF-8305201-	(8. international NEA/seabed working group meeting, Varese, Italy, 30 May-3 Jun 1983)			
	See SAND-83-2122	DE84012873	MN -70	9:30356
CONF-830617-	(76. annual meeting of the Air Pollution Control Association, Atlanta, GA, USA, 19-24 Jun 1983)			
	Proc., Annu. Meet., Air Pollut. Control Assoc., 83-54.2: 16(Jun 1983)			9:31458

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	Proc., Annu. Meet., Air Pollut. Control Assoc., 83-50.1: 22(Jun 1983)			9:31459
	Proc., Annu. Meet., Air Pollut. Control Assoc., 83-29.2: 15(Jun 1983)			9:31467
	Proc., Annu. Meet., Air Pollut. Control Assoc., 83-58.4: 17(Jun 1983)			9:31468
	Proc., Annu. Meet., Air Pollut. Control Assoc., 83-9.8: 22(Jun 1983)			9:31669
	Proc., Annu. Meet., Air Pollut. Control Assoc., 83-31.1: 17(Jun 1983)			9:31670
CONF-8306167-	(4. scientific practical conference of the roentgenologists, radiologists and radiobiologists from North Bulgaria, Gabrovo, Buulgaria, 4 Jun 1983)			
Absts.	*See* INIS-mf-8695	DE84780122	MN 93	9:31785
CONF-8306195-	(AMS-SIAM summer seminar on large-scale computations in fluid mechanics, San Diego, CA, USA, 1 Jun 1983)			
1	*See* LBL-17668	DE84011874	MN -38	9:31457
CONF-830717-	(Small-scale combustion systems - a waste-to-energy workshop, Nashville, TN, USA, 20-21 Jul 1983)			
	See ANL/CNSV-TM-130	DE84009130	MN -95e	9:31103
CONF-830718-	(International Europhysics conference on high energy physics, Brighton, UK, 20-27 Jul 1983)			
31	*See* BNL-34316	DE84010512	MN -34D	9:31980
CONF-830798-	(3. LAMPF II workshop, Los Alamos, NM, USA, 18-29 Jul 1983)			
Vol.1	*See* LA-9933-C-Vol.1	DE84004529	STD -34	9:31991
Vol.2	*See* LA-9933-C-Vol.2	DE84004473	STD -34	9:31992
CONF-8307122-	(Neyman-Kiefer conference, Berkeley, CA, USA, 1-15 Jul 1983)			
1	*See* LBL-16793	DE84012310	MN -48	9:31789
CONF-830822-	(12. international conference on high energy accelerators, Batavia, IL, USA, 11-16 Aug 1983)			
51	*See* BNL-33749	DE84002692	MN -28	9:31469
CONF-830841-	(Cryogenic engineering conference and international cryogenic materials conference, Colorado Springs, CO, USA, 15-19 Aug 1983)			
35	*See* IS-M-466	DE84012835	MN -34	9:31391
CONF-830897-	(NRC workshop on spent fuel/cladding reactions during dry storage, Gaithersburg, MD, USA, 17 Sep-18 Aug 1983)			
	See NUREG/CP-0049	DE84901063	MN -85	9:30304
CONF-8308112-	(3. international Swarm seminar, Innsbruck, Austria, 3-5 Aug 1983)			
	See INIS-mf-8968	DE84780269	MN -34A	9:31918
CONF-8308126-	(NRC research annual review meeting of nuclear waste management research on geochemistry of HLW disposal, Reston, VA, USA, 30-31 Aug 1983)			
	See NUREG/CP-0052	DE84901252	MN -70	9:30345
CONF-8308169-	(EPRI workshop on corrosion product sampling from lhot water systems, Blacksburg, VA, USA, 18-19 Aug 1983)			
	See EPRI-NP-3402-SR	TI84920343	ND -78	9:30693
CONF-8308172-	(International symposium on mechanics of dislocations, Houghton, MI, USA, 28-31 Aug 1983)			
1	*See* LA-UR-84-1621	DE84012448	MN -25	9:31200
CONF-8308175-	(11. international congress of anthropological and ethnological sciences, Vancouver, Canada, 21 Aug 1983)			
1	*See* LA-UR-84-1662	DE84012457	MN -48	9:31829
2	*See* LA-UR-84-1663	DE84012584	MN -48	9:31830
CONF-830910-	(3. national conference on synchrotron radiation instrumentation, Upton, NY, USA, 12-14 Sep 1983)			
13	*See* IS-M-467	DE84012836	MN -28	9:32247
CONF-8309118-	(Topical meeting on free electron generation of extreme ultraviolet coherent radiation, Upton, NY, USA, 19-22 Sep 1983)			
10	*See* LBL-17775	DE84012316	MN -28	9:31408
CONF-8309148-	(SIMS conference on atomic bomb survivor data - utilization and analysis, Alta, UT, USA, 12-16 Sep 1983)			
	See DOE/ER/60155-1	DE84010592	MN -48	9:31765
CONF-8309170-	(Symposium on the use of nonstandard subsized specimens for irradiated testing, Albuquerque, NM, USA, 23 Sep 1983)			
7	*See* IS-M-474	DE84012833	MN -25	9:31197
CONF-8309212-	(Workshop on hard coatings for tribological operation under extreme conditions, Argonne, IL, USA, 8-9 Sep 1983)			
	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84009660	MN -95a	9:31083
CONF-8309219-	(International school of elementary particle physics, Kupari, Yugoslavia, 18 Sep-2 Oct 1983)			
1	*See* RL-83-073	DE84701789	MN -34D	9:32024
CONF-8309237-	(NATO workshop on atmospheric and oceanic circulation in the Mediterranean Basin, Santa Teresa, Italy, 7-14 Sep 1983)			
1	*See* BNL-34653	DE84011562	MN -11	9:31698
CONF-831015-	(Nuclear science symposium, San Francisco, CA, USA, 19-21 Oct 1983)			
	IEEE Trans. Nucl. Sci., 31: No. 1, 879-890(Feb 1984)			9:30769
	IEEE Trans. Nucl. Sci., 31: No. 1, 841-843(Feb 1984)			9:30814
	IEEE Trans. Nucl. Sci., 31: No. 1, 844-848(Feb 1984)			9:30815
	IEEE Trans. Nucl. Sci., 31: No. 1, 849-852(Feb 1984)			9:30816

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	IEEE Trans. Nucl. Sci., 31: No. 1, 726-732(Feb 1984)			9:30817
	IEEE Trans. Nucl. Sci., 31: No. 1, 649-654(Feb 1984)			9:30827
	IEEE Trans. Nucl. Sci., 31: No. 1, 761-765(Feb 1984)			9:30828
	IEEE Trans. Nucl. Sci., 31: No. 1, 757-760(Feb 1984)			9:30829
	IEEE Trans. Nucl. Sci., 31: No. 1, 837-840(Feb 1984)			9:30830
	IEEE Trans. Nucl. Sci., 31: No. 1, 858-861(Feb 1984)			9:30831
	IEEE Trans. Nucl. Sci., 31: No. 1, 543-547(Feb 1984)			9:31427
	IEEE Trans. Nucl. Sci., 31: No. 1, 167-171(Feb 1984)			9:31436
	IEEE Trans. Nucl. Sci., 31: No. 1, 172-174(Feb 1984)			9:31437
	IEEE Trans. Nucl. Sci., 31: No. 1, 175-177(Feb 1984)			9:31438
	IEEE Trans. Nucl. Sci., 31: No. 1, 184-187(Feb 1984)			9:31439
	IEEE Trans. Nucl. Sci., 31: No. 1, 188-192(Feb 1984)			9:31440
	IEEE Trans. Nucl. Sci., 31: No. 1, 193-196(Feb 1984)			9:31441
	IEEE Trans. Nucl. Sci., 31: No. 1, 214-216(Feb 1984)			9:31442
	IEEE Trans. Nucl. Sci., 31: No. 1, 217-224(Feb 1984)			9:31443
	IEEE Trans. Nucl. Sci., 31: No. 1, 239-242(Feb 1984)			9:31444
	IEEE Trans. Nucl. Sci., 31: No. 1, 465-469(Feb 1984)			9:31445
	IEEE Trans. Nucl. Sci., 31: No. 1, 470-473(Feb 1984)			9:31446
	IEEE Trans. Nucl. Sci., 31: No. 1, 818-820(Feb 1984)			9:31447
	IEEE Trans. Nucl. Sci., 31: No. 1, 821-825(Feb 1984)			9:31448
	IEEE Trans. Nucl. Sci., 31: No. 1, 826-827(Feb 1984)			9:31449
	IEEE Trans. Nucl. Sci., 31: No. 1, 121-124(Feb 1984)			9:31519
	IEEE Trans. Nucl. Sci., 31: No. 1, 201-202(Feb 1984)			9:31520
	IEEE Trans. Nucl. Sci., 31: No. 1, 203-204(Feb 1984)			9:31521
	IEEE Trans. Nucl. Sci., 31: No. 1, 211-213(Feb 1984)			9:31522
	IEEE Trans. Nucl. Sci., 31: No. 1, 312-315(Feb 1984)			9:31572
	IEEE Trans. Nucl. Sci., 31: No. 1, 316-319(Feb 1984)			9:31573
	IEEE Trans. Nucl. Sci., 31: No. 1, 320-325(Feb 1984)			9:31574
	IEEE Trans. Nucl. Sci., 31: No. 1, 326-330(Feb 1984)			9:31575
	IEEE Trans. Nucl. Sci., 31: No. 1, 331-335(Feb 1984)			9:31576
	IEEE Trans. Nucl. Sci., 31: No. 1, 197-200(Feb 1984)			9:31577
	IEEE Trans. Nucl. Sci., 31: No. 1, 225-229(Feb 1984)			9:31578
	IEEE Trans. Nucl. Sci., 31: No. 1, 236-238(Feb 1984)			9:31579
	IEEE Trans. Nucl. Sci., 31: No. 1, 253-257(Feb 1984)			9:31580
	IEEE Trans. Nucl. Sci., 31: No. 1, 417-423(Feb 1984)			9:31581
	IEEE Trans. Nucl. Sci., 31: No. 1, 433-437(Feb 1984)			9:31582
	IEEE Trans. Nucl. Sci., 31: No. 1, 429-432(Feb 1984)			9:31583
	IEEE Trans. Nucl. Sci., 31: No. 1, 509-511(Feb 1984)			9:31584
	IEEE Trans. Nucl. Sci., 31: No. 1, 900(Feb 1984)			9:31585
	IEEE Trans. Nucl. Sci., 31: No. 1, 664-667(Feb 1984)			9:31586
	IEEE Trans. Nucl. Sci., 31: No. 1, 512-515(Feb 1984)			9:31587
	IEEE Trans. Nucl. Sci., 31: No. 1, 484-489(Feb 1984)			9:31588
	IEEE Trans. Nucl. Sci., 31: No. 1, 474-479(Feb 1984)			9:31589
	IEEE Trans. Nucl. Sci., 31: No. 1, 461-464(Feb 1984)			9:31590
	IEEE Trans. Nucl. Sci., 31: No. 1, 367-371(Feb 1984)			9:31591
	IEEE Trans. Nucl. Sci., 31: No. 1, 399-403(Feb 1984)			9:31592
	IEEE Trans. Nucl. Sci., 31: No. 1, 396-398(Feb 1984)			9:31593
	IEEE Trans. Nucl. Sci., 31: No. 1, 162-166(Feb 1984)			9:32425
	IEEE Trans. Nucl. Sci., 31: No. 1, 811-817(Feb 1984)			9:32426
CONF-831025-	(26. ORNL-DOE conference on analytical chemistry in energy technology, Knoxville, TN, USA, 11-13 Oct 1983)			
33	*See* IS-M-469	DE84012834	MN -4	9:31288
34	*See* IS-M-471	DE84012831	MN -4	9:31289
CONF-831039-	(International coal testing conference, Lexington, KY, USA, 24-26 Oct 1983)			
1-Rev.1	*See* IS-M-463-Rev.1	DE84012139	MN -90a	9:30164
CONF-8310143-	(11. NRC water reactor safety research information meeting, Gaithersburg, MD, USA, 14-24 Oct 1983)			
Vol.1	*See* NUREG/CP-0048-Vol.1	DE84900510	MN -78	9:30885
Vol.6	*See* NUREG/CP-0048-Vol.6	DE84900650	MN -78	9:30915
CONF-8310160-	(3. DOE workshop on computer-aided engineering, Livermore, CA, USA, 13-14 Oct 1983)			
Suppl.	NTIS, PC A13; 3 (GPO Dep.)	DE84007776	MN -38	9:31376
CONF-8310205-	(TMS-AIME fall meeting, Philadelphia, PA, USA, 2-6 Oct 1983)			
7	*See* EGG-M-05283	DE84005031	MN -38	9:31420
CONF-8310227-	(Monopole '83 conference, Ann Arbor, MI, USA, 6-9 Oct 1983)			
8	*See* IS-M-468	DE84012871	MN -34	9:31392
CONF-8310268-	(International symposium on concepts of fatigue crack growth threshold, Philadelphia, PA, USA, 2-6 Oct 1983)			
2	*See* IS-M-465	DE84012837	MN -25	9:31196
CONF-8311110-	(6. workshop on environmental research for actinide elements, Hilton Head Island, SC, USA, 7-11 Nov 1983)			
4	*See* PNL-SA-11792	DE84011903	MN -41	9:31676
CONF-8311145-	(Diesel equipment in underground coal mines meeting, Richlands, VA, USA, 29 Nov 1983)			
	NTIS, PC A06/MF A01	DE84900864	MN -88	9:30219
CONF-831203-	(10. symposium on fusion engineering, Philadelphia, PA, USA, 5-9 Dec 1983)			
140	*See* UCRL-89222	DE84012601	MN -20	9:32326
141	*See* UCRL-89204	DE84012602	MN -20b	9:32368
142	*See* UCRL-89202	DE84012603	MN -20d	9:32324
143	*See* UCRL-89220	DE84012604	MN -20d	9:32372
144	*See* UCRL-89223	DE84012598	MN -20d	9:32373

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145	*See* UCRL-89474	DE84012599	MN -20d	9:32329
146	*See* UCRL-89207	DE84012590	MN -20	9:32371
147	*See* UCRL-89268	DE84012589	MN -20	9:32375
148	*See* UCRL-89206	DE84012596	MN -20	9:32370
149	*See* UCRL-89221	DE84012540	MN -20	9:32325
150	*See* UCRL-89224	DE84012539	MN -20	9:32327
151	*See* UCRL-89283	DE84012541	MN -20	9:32328
152	*See* UCRL-89282	DE84012588	MN -20d	9:32377
153	*See* UCRL-89267	DE84012600	MN -20a	9:32374
154	*See* UCRL-89281	DE84012597	MN -20a	9:32376
155	*See* UCRL-89403	DE84012595	MN -20d	9:32378
156	*See* UCRL-89205	DE84012592	MN -20b	9:32369
157	*See* UCRL-98355	DE84012591	MN -20d	9:32330
CONF-831217-	(5. civilian radioactive waste management information meeting, Washington, DC, USA, 12-15 Dec 1983)			
	NTIS, PC A19/MF A01; 1 (GPO Dep.)	DE84009395	STD -70	9:30319
CONF-831244-	(2. conference on municipal, hazardous and coal wastes management, Miami Beach, FL, USA, 5-7 Dec 1983)			
2	*See* IS-M-478	DE84012840	MN -90i	9:30173
CONF-831277-	(1. international conference on the physics of the 21st century, Tuscon, AZ, USA, 5-8 Dec 1983)			
1	*See* BNL-34712	DE84012172	MN -34D	9:32013
CONF-831278-	(2. international workshop on the physics of semiconductor devices, New Delhi, India, 5-10 Dec 1983)			
1	*See* LBL-17393	DE84012165	MN -59b	9:30558
CONF-831281-	(Nicograph conference, Tokyo, Japan, 1-3 Dec 1983)			
1	*See* UCRL-89934	DE84012606	MN -32	9:32423
CONF-840102-	(2. Berkeley catalysis and surface science conference, Berkeley, CA, USA, 11-13 Jan 1984)			
1	*See* LBL-17623	DE84012253	MN -4	9:30438
CONF-840111-	(8. annual symposium on energy from biomass and wastes, Lake Buena Vista, FL, USA, 30 Jan-3 Feb 1984)			
7	*See* BNL-34460	DE84011544	MN -61D	9:30442
CONF-840124-	(American Society of Heating, Refrigerating and Air-Conditioning Engineers meeting, Atlanta, GA, USA, 29 Jan-1 Feb 1984)			
7	*See* LBL-16369	DE84012260	MN -95d	9:31065
CONF-840145-	(INDO-US workshop on diffusion in solids, Bombay, India, 9-13 Jan 1984)			
2	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012105	MN -25	9:31221
CONF-840148-	(3. international conference on baryon non-conservation, Park City, UT, USA, 4-7 Jan 1984)			
2	*See* LA-UR-84-890	DE84010067	MN -38	9:31393
CONF-840150-	(4. Moriond workshop on massive neutrinos in particle and astro-physics, La Plagne, France, 15-21 Jan 1984)			
5	*See* FERMILAB-CONF-84/33-T	DE84012468	MN -34D	9:31982
CONF-840154-	(PSSC fixed target workshop, Woodland, TX, USA, 27-29 Jan 1984)			
2	*See* SLAC-PUB-3345	DE84012228	MN -34D	9:32001
CONF-840158-	(INS winter school on accelerators for nuclear physics, Kikuchi, Japan, 29 Jan-2 Feb 1984)			
1	*See* TRI-PP-84-10	DE84901247	MN -28	9:31480
2	*See* FERMILAB/TM-1259	DE84012518	MN -28	9:31525
CONF-840256-	(Chapman conference on collisionless shock waves in the heliosphere, Napa Valley, CA, USA, 20-24 Feb 1984)			
4	*See* LA-UR-84-1504	DE84012625	MN -34B	9:31870
CONF-840275-	(Workshop on anti pp options for the SSC, Chicago, IL, USA, 13-17 Feb 1984)			
7	*See* LBL-17688	DE84011581	MN -34D	9:32021
8	*See* ANL-HEP-CP-84-19	DE84011811	MN -34D	9:31979
CONF-840280-	(Recontre de Moriond meeting on electro weal interactions and unified theories, La Plaque, France, 26 Feb-4 Mar 1984)			
3	*See* LA-UR-84-1666	DE84012583	MN -34B	9:31864
4	*See* LA-UR-84-1667	DE84012442	MN -34B	9:31865
5	*See* SLAC-PUB-3323	DE84012512	MN -34D	9:31998
6	*See* SLAC-PUB-3335	DE84012892	MN -34D	9:31999
CONF-840284-	(3. international winterschool on new developments in solid state physics, Salzubrg, Austria, 26 Feb-2 Mar 1984)			
2	*See* UCRL-90789	DE84012611	MN -34	9:32284
CONF-840288-	(Symposium on better ceramics through chemistry, Albuquerque, NM, USA, 27-29 Feb 1984)			
1	*See* SAND-83-1949C	DE84009921	MN -25	9:31232
CONF-840302-	(11. annual energy technology conference and exposition, Washington, DC, USA, 19-21 Mar 1984)			
5	*See* EGG-M-04584	DE84012616	MN -95f	9:31087
CONF-840307-	(Waste management '84, Tucson, AZ, USA, 11-15 Mar 1984)			
36	*See* EGG-M-04684	DE84011747	MN -70B	9:30389
38	*See* EGG-M-18283	DE84011749	MN -16	9:30396
43	*See* EGG-M-19183	DE84012279	MN -70	9:30325
CONF-840311-	(4. international symposium on heating in toroidal plasmas, Rome, Italy, 21-28 Mar 1984)			
7	*See* DOE/ET/51013-117	DE84010308	STD -20g	9:32306
13	*See* GA-A-17528	DE84012471	MN -20a	9:32311

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CONF-840320-	(Cogeneration and energy conservation seminar, San Francisco, CA, USA, 5 Mar 1984)			
1	*See* LBL-17330	DE84009628	MN -95d	9:31066
CONF-840385-	(15. lunar and planetary science conference, Houston, TX, USA, 12-16 Mar 1984)			
2	*See* LA-UR-84-1574	DE84012440	MN -32	9:32416
CONF-840387-	(2. topical meeting on laser techniques in the extreme ultraviolet, Boulder, CO, USA, 5-7 Mar 1984)			
8	*See* UCRL-90334	DE84012594	MN -21	9:32380
9	*See* UCRL-90335	DE84012593	MN -21	9:32381
CONF-840396-	(International conference on instrumentation for colliding beam physics, Novosibirsk, USSR, 15-21 Mar 1984)			
3	*See* SLAC-PUB-3311	DE84012221	MN -34D	9:31517
CONF-8403100-	(Conference of Z-pinches for fusion, Alexandria, VA, USA, 29-30 Mar 1984)			
1	*See* LA-UR-84-1077	DE84009996	MN -20f	9:32317
3	*See* LA-UR-84-1075	DE84009992	MN -20d	9:32358
CONF-8403121-	(New particle production at high energy meeting: The Recontre de Moriond, La Plagne, France, 4-10 Mar 1984)			
3	*See* SLAC-PUB-3312	DE84012222	MN -34D	9:31997
CONF-8403123-	(32. annual scientific meeting of Radiation Research Society, Orlando, FL, USA, 1 Mar 1984)			
1	*See* PNL-SA-11768	DE84011871	MN -34A	9:31958
CONF-8403124-	(Sanibel symposia, Palm Coast, FL, USA, 1-3 Mar 1984)			
1	*See* LBL-17611	DE84012166	MN -4	9:31954
2	*See* LBL-17715	DE84011804	MN -4	9:32280
CONF-8403126-	(Winter school on fundamental nuclear physics, Trieste, Italy, 11 Mar-13 Apr 1984)			
1	*See* UCRL-90806	DE84012319	MN -34D	9:32125
2	*See* UCRL-90807	DE84012318	MN -34C	9:32230
CONF-8403127-	(5. Nordic meeting on nuclear physics, Jyvaskyla, Finland, 12-16 Mar 1984)			
1	*See* LBL-17720	DE84012255	MN -34C	9:32099
CONF-840403-	(4. international symposium on gaseous dielectrics, Knoxville, TN, USA, 29 Apr-3 May 1984)			
6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012340	MN -41	9:31237
CONF-840411-	(3. meeting on liquid metal in energy applications, Oxford, UK, 9-13 Apr 1984)			
21	*See* EGG-M-13583	DE84012769	MN -79k	9:30764
22	*See* EGG-M-13383	DE84012768	MN -79k	9:30763
CONF-840413-	(Topical meeting on robotics and remote handling in hostile environments, Gatlinburg, TN, USA, 23-26 Apr 1984)			
6	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011645	MN -86	9:30293
CONF-840423-	(Transmission and distribution conference and exposition, Kansas City, MO, USA, 29 Apr-4 May 1984)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012349	MN -97c	9:30607
CONF-840434-	(6. annual industrial energy conservation technology conference, Houston, TX, USA, 15-18 Apr 1984)			
2	*See* EGG-M-10084	DE84012525	MN -95f	9:31088
3	*See* EGG-M-15583	DE84012535	MN -95f	9:31089
CONF-840440-	(86. annual meeting and exposition of the American Ceramic Society, Pittsburgh, PA, USA, 29 Apr-3 May 1984)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012352	MN -90h	9:31238
CONF-840449-	(2. symposium on resonance ionization spectroscopy and its applications, Knoxville, TN, USA, 16-20 Apr 1984)			
11	*See* LA-UR-84-1623	DE84012449	MN -34	9:32228
CONF-840461-	(20. annual meeting of the National Council on Radiation Protection and Measurements, Washington, DC, USA, 4-5 Apr 1984)			
1	*See* LBL-17431	DE84012740	MN -41	9:31790
CONF-840476-	(Fusion Power Associates annual meeting and symposium on fusion power development --the next decade, Livermore, CA, USA, 2-3 Apr 1984)			
1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011582	MN -20	9:32340
2	*See* UCRL-90758	DE84012739	MN -21	9:32382
CONF-840497-	(31. international technical communication conference, Seattle, WA, USA, 29 Apr-2 May 1984)			
11	*See* EGG-M-01784	DE84012648	MN -13	9:32397
12	*See* EGG-M-01284	DE84012642	MN -13	9:32396
CONF-8404106-	(International symposium on the properties and applications of metal hydrides, Eilat, Israel, 9-13 Apr 1984)			
3	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012109	MN -34C	9:31222
CONF-8404107-	(Society of Computer Simulation mini conference, Norfolk, VA, USA, 20-22 Apr 1984)			
2	*See* EGG-M-25983	DE84012647	MN -80	9:30825
CONF-8404110-	(4. international conference on high temperature science - HYTHERM, Santa Fe, NM, USA, 2-6 Apr 1984)			
4	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012106	MN -25	9:31140
CONF-8404119-	(Workshop on gauge theory on lattice, Argonne, IL, USA, 5-7 Apr 1984)			
2	*See* ANL-HEP-CP-84-20	DE84011810	MN -34D	9:32044
CONF-8404121-	(17. oil shale symposium, Golden, CO, USA, 16-18 Apr 1984)			
6	*See* LA-UR-84-1558	DE84012636	MN -91	9:30266
7	*See* UCRL-90221	DE84012614	MN -91	9:30273

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-8404123-	(2. symposium on energy engineering sciences, Argonne, IL, USA, 10-12 Apr 1984)			
2	*See* LA-UR-84-1185	DE84011374	MN -38	9:31432
3	*See* PNL-SA-12197	DE84011905	MN -94a	9:31419
4	*See* LBL-17487	DE84012054	MN -4	9:31362
6	*See* EGG-M-11684	DE84012536	MN -38	9:31421
CONF-8404124-	(SPIE technical symposium, Arlington, VA, USA, 29 Apr-4 May 1984)			
6	*See* LA-UR-84-1722	DE84012586	MN -28	9:31514
7	*See* LA-UR-84-1413	DE84012659	MN -21	9:32359
CONF-8404126-	(86. annual general meeting of Canadian Institute of Mining, Ottawa, Canada, 15-18 Apr 1984)			
2	*See* EGG-M-06284	DE84012538	MN -78	9:30864
3	*See* EGG-M-06384	DE84012543	MN -78	9:30865
CONF-8404138-	(8. national engineering symposium of the Mexican American Engineering Society, Albuquerque, NM, USA, 11-13 Apr 1984)			
4	*See* EGG-M-08784	DE84012537	MN -80	9:30824
CONF-8404143-	(10. international conference on cyclotrons and their applications, East Lansing, MI, USA, 30 Apr-3 May 1984)			
1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011446	MN -28	9:31470
5	*See* FERMILAB/TM-1261	DE84012521	MN -28	9:31471
6	*See* LBL-17759	DE84012317	MN -28	9:31955
CONF-8404146-	(International workshop on fundamental aspects of post-dryout heat transfer, Salt Lake City, UT, USA, 2-4 Apr 1984)			
1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011711	MN -78	9:30861
2	*See* EGG-M-06484	DE84012615	MN -80	9:30866
3	*See* SAND-84-1040C	DE84012765	MN -80	9:30951
CONF-8404148-	(American Foundrymen Society casting congress, St. Louis, MO, USA, 30 Apr-4 May 1984)			
1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011632	MN -25	9:31145
CONF-8404150-	(European conference on surface science, York, UK, 1-5 Apr 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011640	MN -25	9:31146
CONF-8404153-	(11. annual meeting of the National Organization for the Professional Advancement of Black Chemists and Chemical Engineers, Houston, TX, USA, 25-28 Apr 1984)			
1	*See* MLM-3153(OP)	DE84012397	MN -4	9:31637
2	*See* K/OA-5643	DE84012853	MN -2	9:30399
CONF-8404155-	(5. workshop on grand unification, Providence, RI, USA, 12-14 Apr 1984)			
1	*See* LA-UR-84-1623	DE84012449	MN -34	9:32228
CONF-8404156-	(8. symposium on aquatic toxicology, Ft. Mitchell, KY, USA, 15-19 Apr 1984)			
1	*See* PNL-SA-11833	DE84011873	MN -11	9:31814
CONF-8404157-	(19. winter school on physics, Zakopane, Poland, 3-15 Apr 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011671	MN -34C	9:32108
CONF-8404158-	(Intellignet systems and machines conference, Rochester, MI, USA, 24-25 Apr 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011666	MN -38	9:31377
CONF-8404159-	(North Dakota's Industrial Climate conference, Grand Forks, ND, USA, 26-27 Apr 1984)			
1	*See* DOE/FE/60181-90	DE84011559	MN -90	9:30097
CONF-8404160-	(13. ASME annual conference, San Antonio, TX, USA, 23-26 Apr 1984)			
1	*See* PNL-SA-12192	DE84011899	MN -38	9:31424
CONF-8404162-	(3. international conference on semi-insulating III-V materials, Warm Springs, OR, USA, 24-26 Apr 1984)			
1	*See* LBL-17802	DE84012312	MN -25	9:31265
CONF-8404163-	(6. international conference on high energy physics, Nashville, TN, USA, 5-7 Apr 1984)			
1	*See* SLAC-PUB-3336	DE84012375	MN -34D	9:32000
CONF-8404164-	(Meeting of the Deutsche Bunsen-Gesellschaft fuer Physikalische Chemie, Koenigstein, F.R. Germany, 4-6 Apr 1984)			
1	*See* LBL-17769	DE84012261	MN -4	9:30234
CONF-8404165-	(FORTRAN forum, Geneva, Switzerland, 13 Apr 1984)			
1	*See* EGG-M-06084	DE84012526	MN -32	9:32409
CONF-840503-	(Conference on energy for small and middle sized countries, Tel Aviv, Israel, 13-16 May 1984)			
1	*See* LA-UR-84-1426	DE84012663	MN -66i	9:30584
CONF-840504-	(Southeastern conference on theoretical and applied mechanics, Pine Mountain, GA, USA, 10-11 May 1984)			
3	*See* EGG-M-06784	DE84012770	MN -80	9:30868
4	*See* EGG-M-06684	DE84012771	MN -80	9:30867
CONF-840512-	(6. congress of the International Radiation Protection Association, Berlin, F.R. Germany, 7-12 May 1984)			
8	*See* EGG-M-27182	DE84012644	MN -41	9:31533
9	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012345	MN -48	9:32253
10	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012354	MN -41	9:31752
CONF-840516-	(International symposium on aging in tests of safety equipment for nuclear power plants, Paris, France, 15-16 May 1984)			
6	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012343	MN -80	9:30714

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CONF-840518-	(IEA conference on heat pumps - current situation and future prospects, Graz, Austria, 22-25 May 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012357	MN -95d	9:31054
CONF-840520-	(6. international conference on plasma surface interactions in controlled fusion devices, Nagoya, Japan, 14-18 May 1984)			
2	*See* SAND-83-2614C	DE84011684	MN -20	9:32365
3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012329	MN -20f	9:32299
4	*See* SAND-83-2641C	DE84012235	MN -20	9:32321
5	*See* LBL-16979	DE84012259	MN -20a	9:32360
6	*See* UCRL-90161	DE84012612	MN -20	9:32379
CONF-840529-	(Linear accelerator conference, Darmstadt-Seeheim, F.R. Germany, 7-11 May 1984)			
26	*See* BNL-34750	DE84011917	MN -28	9:31502
27	*See* SLAC-PUB-3330	DE84011196	MN -28	9:31479
28	*See* SAND-84-0095C	DE84011191	MN -28	9:31495
36	*See* LBL-17349	DE84011817	MN -28	9:31515
37	*See* UCRL-90395	DE84012320	MN -28	9:31481
CONF-840530-	(International symposium on in-beam nuclear spectroscopy, Debrecen, Hungary, 14-18 May 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012327	MN -34C	9:32107
2	*See* UCRL-90749	DE84012643	MN -34	9:32106
CONF-840531-	(6. annual symposium on safeguards and nuclear material management, Venice, Italy, 14-18 May 1984)			
4	*See* MLM-3148(OP)	DE84012398	MN -16	9:31292
5	*See* LA-UR-84-1437	DE84012664	MN -15	9:30401
6	*See* LA-UR-84-1436	DE84012665	MN -15	9:30400
8	*See* LA-UR-84-1516	DE84012633	MN -15	9:30403
9	*See* LA-UR-84-1513	DE84012630	MN -15	9:30402
10	*See* MLM-3155(OP)	DE84012367	MN -15	9:30404
CONF-840570-	(Materials for future energy systems conference, Washington, DC, USA, 1-3 May 1984)			
5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012333	MN -90d	9:30099
7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012330	MN -79h	9:30762
CONF-840577-	(30. international instrumentation symposium, Denver, CO, USA, 7-10 May 1984)			
7	*See* EGG-M-17883	DE84012645	MN -78	9:30869
8	*See* EGG-M-03984	DE84012646	MN -78	9:30846
CONF-8405144-	(International groundwater symposium, Montreal, Quebec, Canada, 21-23 May 1984)			
2	*See* EGG-M-03884	DE84012652	MN -66e	9:30590
CONF-8405145-	(IMOG/NSG meeting, Tampa, FL, USA, 15-16 May 1984)			
2	*See* LA-UR-84-1526	DE84012635	MN -38	9:31368
CONF-8405152-	(Du Pont environmental forum, Wilmington, DE, USA, 3 May 1984)			
1	*See* DP-MS-84-35	DE84011513	MN -11	9:31707
CONF-8405153-	(Horizontal-axis wind turbine technology conference, Cleveland, OH, USA, 8-10 May 1984)			
1	*See* SAND-84-0924C	DE84011257	MN -60	9:30605
CONF-8405154-	(American Institute of Chemical Engineers spring national meeting, Anaheim, CA, USA, 20-23 May 1984)			
3	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012341	MN -90i	9:30169
4	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012355	MN -90d	9:30102
CONF-8405155-	(Inner space/outer space conference, Batavia, IL, USA, 2-5 May 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011731	MN -20g	9:31862
CONF-8405156-	(American Industrial Hygiene Association conference, Detroit, MI, USA, 20-25 May 1984)			
1	*See* UCRL-90588	DE84011561	MN -41	9:31403
CONF-8405160-	(Refractory metal silicide workshop, San Juan Bautista, CA, USA, 14-17 May 1984)			
1-Abst.	*See* SAND-84-0378C	DE84011683	MN -25	9:31613
CONF-8405161-	(LABCON west conference, Long Beach, CA, USA, 8-10 May 1984)			
1	*See* HEDL-SA-3077-FP	DE84012379	MN -38	9:31387
CONF-8405162-	(Symposium on recent developments in computing, processor, and software research for high-energy physics, Guanajuato, Mexico, 8-11 May 1984)			
1	*See* SLAC-PUB-3332	DE84012513	MN -34D	9:32420
CONF-8405163-	(Anomalous absorption conference, Charlottesville, VA, USA, 6-11 May 1984)			
1	*See* DOE/DP/40124-37	DE84012392	MN -21	9:32347
2	*See* DOE/DP/40124-38	DE84012391	MN -21	9:32303
3	*See* DOE/DP/40124-32	DE84012533	MN -21	9:32301
4	*See* DOE/DP/40124-36	DE84012488	MN -21	9:32302
5	*See* DOE/DP/40124-34	DE84012487	MN -21	9:32346
CONF-8405164-	(IAEA technical committee/workshop on the uses of computer codes for nuclear reactor safety analysis, Varna, Bulgaria, 29 May-1 Jun 1984)			
1	*See* LA-UR-84-1620	DE84012437	MN -78	9:30878
2	*See* LA-UR-84-1649	DE84012455	MN -78	9:30879
3	*See* LA-UR-84-1650	DE84012456	MN -78	9:30733
CONF-8405165-	(CEC/NEA workshop, Brussels, Belgium, 15-17 May 1984)			
1	*See* SAND-84-0986C	DE84011485	MN -70	9:30359

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CONF-8405168-	(International colloquium on group theoretical methods in physics, College Park, MD, USA, 21-25 May 1984)			
1	*See* LA-UR-84-1505	DE84012629	MN -34D	9:32295
CONF-8405169-	(Electric Power Research Institute indoor air quality workshop, Denver, CO, USA, 1 May 1984, 1 May 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012331	MN -11	9:31651
CONF-8405170-	(ETR-INTOR workshop, Atlanta, GA, USA, 1-2 May 1984)			
1	NTIS, PC A02; 1 (GPO Dep.)	DE84012332	MN -20a	9:32300
CONF-8405171-	(13. midyear meeting of the American Society for Information Science, Bloomington, IN, USA, 20-23 May 1984)			
1	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012324	MN -32	9:32406
CONF-8405172-	(International Society of Parametric Analysts conference, San Francisco, CA, USA, 13-18 May 1984)			
1	*See* EGG-M-08584	DE84012649	MN -38	9:31367
CONF-8405173-	(Mark IV users group meeting, New York, NY, USA, 1 May 1984)			
1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012334	MN -32	9:32407
CONF-8405174-	(4. symposium on hazardous and industrial solid waste testing, Arlington, VA, USA, 2-8 May 1984)			
1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012335	MN -11	9:31684
CONF-8405175-	(Mathematics finite element and applications conference, London, UK, 2-7 May 1984)			
1	NTIS, PC A02; 3 (GPO Dep.)	DE84012323	MN -32	9:32408
CONF-8405176-	(American Society of Lubrication Engineers meeting, Chicago, IL, USA, 1 May 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012344	MN -25	9:31223
CONF-8405177-	(American Physical Society Division of Electron and Atomic Physics conference, Storrs, CT, USA, 29-31 May 1984)			
1	*See* LA-UR-84-1424	DE84012660	MN -34A	9:31952
CONF-8405178-	(Operations Research Society of America national meeting, San Francisco, CA, USA, 16 May 1984)			
1	*See* UCRL-90777	DE84012609	MN -2	9:32424
CONF-8405179-	(International conference on theoretical approaches to heavy ion reaction mechanisms, Paris, France, 14-18 May 1984)			
1	*See* LA-UR-84-1566	DE84012441	MN -34C	9:32227
CONF-8405180-	(IAU colloquium, Toronto, Canada, 29 May-1 Jun 1984)			
1	*See* LA-UR-84-1640	DE84012453	MN -34B	9:31863
CONF-8405181-	(35. annual international appliance technical conference, Columbus, OH, USA, 15-16 May 1984)			
1	*See* LBL-17501	DE84012574	MN -95f	9:31067
CONF-8405182-	(ASME robotics symposium, Albuquerque, NM, USA, 22 May 1984)			
1	*See* SAND-84-1127C	DE84012237	MN -38	9:31399
CONF-8405183-	(Joint Army Navy Nasa Air Force S and EPS annual meeting, Las Cruces, NM, USA, 7-11 May 1984)			
1	*See* UCRL-89687	DE84012267	MN -11	9:31664
CONF-8405184-	(Meridian technology transfer conference, Washington, DC, USA, 30-31 May 1984)			
1	*See* SAND-84-1063C	DE84012233	MN -13	9:32440
CONF-8405185-	(32. annual conference on mass spectrometry and allied topics, San Antonio, TX, USA, 27 May-2 Jun 1984)			
1	*See* MLM-3154(OP)	DE84012425	MN -45	9:31638
CONF-8405186-	(Defense Advanced Research Projects Agency/Air Force Office of Scientific Research program review, Santa Fe, NM, USA, 6-10 May 1984)			
1	*See* UCRL-90710	DE84012610	MN -11	9:31834
CONF-840604-	(12. international symposium on effects of radiation on materials, Williamsburg, VA, USA, 18-20 Jun 1984)			
6	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012111	MN -25	9:31144
CONF-840614-	(Annual meeting of the American Nuclear Society, New Orleans, LA, USA, 3-8 Jun 1984)			
50	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011745	MN -20c	9:32341
51	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012091	MN -20c	9:32342
53	*See* HEDL-SA-3066-FP	DE84012378	MN -79	9:30847
54	*See* HEDL-SA-3054-FP	DE84012416	MN -79a	9:30765
55	*See* GA-A-17469	DE84012180	MN -77	9:30745
56	*See* LA-UR-84-1626	DE84012450	MN -28	9:31513
57	*See* SAND-84-1039C	DE84012764	MN -80	9:30950
CONF-840617-	(12. DOE surface science/SUBWOG - 7. SUBWOG - 12B technical exchange meeting, Oak Ridge, TN, USA, 11-14 Jun 1984)			
1	*See* SAND-84-1173C	DE84012811	MN -4	9:31315
CONF-840622-	(Annual meeting of the American Solar Energy Society, Anaheim, CA, USA, 5-9 Jun 1984)			
12	*See* PNL-SA-12261	DE84011878	MN -63	9:30506
CONF-840627-	(29. annual meeting of the Health Physics Society, New Orleans, LA, USA, 3-7 Jun 1984)			
1	*See* LA-UR-84-1723	DE84012587	MN -41	9:31641
3	*See* LA-UR-84-1523	DE84012631	MN -41	9:31640
CONF-840695-	(4. annual advanced gasification contractors' meeting, Morgantown, WV, USA, 26-28 Jun 1984)			
1	*See* DOE/FE/60181-97	DE84012922	MN -90	9:30158
CONF-8406119-	(31. power sources symposium, Cherry Hills, NY, USA, 12 Jun 1984)			
1	*See* SAND-84-0716C	DE84011482	MN -94cb	9:30981

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CONF-8406120-	(20. AIAA/ASME/SAE joint propulsion conference, Cincinnati, OH, USA, 11-13 Jun 1984)			
1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011710	MN -38	9:31415
CONF-8406121-	(Contractors' conference - DOE advanced research and technology development program, Pittsburgh, PA, USA, 5-7 Jun 1984)			
1-Abst.	*See* DOE/FE/60181-96	DE84012921	MN -90	9:30115
2	*See* DOE/FE/60181-91	DE84012923	MN -90	9:30157
3	*See* DOE/FE/60181-89	DE84012924	MN -90	9:30156
4	*See* DOE/FE/60181-94	DE84012875	MN -90	9:30215
CONF-8406122-	(Precision machining workshop, Society of Manufacturing Engineers, Berkeley, CA, USA, 5 Jun 1984, 5 Jun 1984)			
1	*See* UCRL-90833	DE84012570	MN -38	9:31369
CONF-8406123-	(IAEA Technical Committee meeting on inorganic ion exchangers and absorbents for chemical processing in the nuclear fuel cycle, Vienna, Austria, 12-15 Jun 1984)			
1	*See* DP-MS-84-49	DE84012564	MN -70	9:30833
CONF-8406124-	(2. workshop on containment integrity, Washington, DC, USA, 13-15 Jun 1984)			
1	*See* SAND-84-0904C	DE84012651	MN -78	9:30949
2	*See* SAND-84-1095C	DE84012655	MN -80	9:30952
3	*See* SAND-84-0805C	DE84012280	MN -80	9:30948
CONF-8406125-	(Army research workshop on chaos and nonlinear systems, Durham, NC, USA, 15 Jun 1984)			
1	*See* LA-UR-84-1734	DE84012577	MN -34A	9:31953
CONF-8406126-	(Robots conference, Detroit, MI, USA, 4-7 Jun 1984)			
1	*See* HEDL-SA-3014FP	DE84011805	MN -38	9:31386
CONF-8406127-	(WRI/DOE tar sands symposium, Vail, CO, USA, 27-29 Jun 1984)			
1	*See* SAND-84-1088C	DE84012236	MN -91	9:30271
CONF-8406129-	(MRS European meeting, Strasbourg, France, 5-8 Jun 1984)			
1	*See* SAND-84-0724C	DE84012653	MN -70	9:31266
CONF-8406130-	(Symposium on prediction of agricultural non-point source pollution: model selection and application, Venice, Italy, 11-15 Jun 1984)			
1	*See* LA-UR-84-1647	DE84012454	MN -11	9:30343
CONF-8406131-	(1. SP-100 program integration meeting, Danvers, MA, USA, 13-15 Jun 1984)			
1	*See* LA-UR-84-1559	DE84012640	MN -33A	9:30877
2	*See* LA-UR-84-1705	DE84012581	MN -38	9:31418
CONF-840701-	(Topical meeting on fission product behavior and source term research, Snowbird, UT, USA, 15-19 Jul 1984)			
1-Summ.	NTIS, PC A02/MF A01 (GPO Dep.)	DE84004008	MN -78	9:30856
2	NTIS, PC A02/MF A01; 1	DE84004007	MN -78	9:30857
4	*See* SAND-83-2677C	DE84006290	MN -78	9:30946
5	NTIS, PC A02/MF A01 (GPO Dep.)	DE84006402	MN -78	9:30858
6	NTIS, PC A02/MF A01 (GPO Dep.)	DE84006416	MN -78	9:30859
7	NTIS, PC A02/MF A01 (GPO Dep.)	DE84006552	MN -79p	9:30860
8	*See* HEDL-SA-3055	DE84007169	MN -78	9:30873
11	*See* SAND-84-0171C	DE84012766	MN -78	9:30947
CONF-840702-	(5. world hydrogen energy conference, Toronto, Canada, 15-19 Jul 1984)			
1	*See* LA-UR-84-232	DE84006026	MN -4	9:30436
1-Rev.	*See* LA-UR-84-232-Rev.	DE84007496	MN -4	9:30437
2	*See* LA-UR-84-182	DE84006021	MN -4	9:30435
CONF-840703-	(8. world conference on earthquake engineering, San Francisco, CA, USA, 21-28 Jul 1984)			
1	*See* UCRL-90029	DE84003727	MN -78	9:30956
CONF-840706-	(Power Engineering Society summer meeting, Seattle, WA, USA, 15-20 Jul 1984)			
1	*See* LA-UR-84-348	DE84006033	MN -97c	9:30649
CONF-840710-	(National computer conference, Las Vegas, NV, USA, 1 Jul 1984)			
1	*See* LA-UR-83-3085	DE84001722	MN -32	9:32415
CONF-840711-	(American Electroplaters' Society SUR/FIN '84 conference, New York, NY, USA, 1 Jul 1984)			
1	*See* UCRL-89933	DE84002715	MN -25	9:31203
3	*See* LA-UR-84-877	DE84010070	MN -25	9:31199
CONF-840712-	(21. IEEE annual conference on nuclear and space radiation effects, Colorado Springs, CO, USA, 22-25 Jul 1984)			
3	*See* SAND-84-0579C	DE84009448	MN -38	9:30514
CONF-840718-	(International conference on structural impact and crashworthiness, London, UK, 16-20 Jul 1984)			
1	*See* UCRL-86247	DE84005135	MN -80	9:30955
CONF-840720-	(International conference on numerical methods for transient and coupled problems, Venice, Italy, 9-13 Jul 1984)			
1	*See* LA-UR-84-344	DE84006032	MN -34	9:32294
CONF-840721-	(Engineering Foundation conference on compressibility phenomena in subsidence, Henniker, NH, USA, 29 Jul-3 Aug 1984)			
1	*See* SAND-84-0064C	DE84006963	MN -38	9:31425
CONF-840725-	(3. international conference on infrared physics, Zurich, Switzerland, 23-27 Jul 1984)			
1	*See* DOE/ER/10978-7	DE84007350	MN -34	9:31405
3-Summ.	*See* LBL-17293	DE84009223	MN -34	9:31264

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-840731-	(HEART conference, Colorado Springs, CO, USA, 26-27 Jul 1984)			
1	*See* SAND-84-7120C	DE84009492	MN -38	9:31433
CONF-840744-	(American Society of Civil Engineers Irrigation and Drainage Div. specialty conference, Flagstaff, AZ, USA, 24-26 Jul 1984)			
2	*See* LA-UR-84-1415	DE84012658	MN -11	9:31643
CONF-840745-	(Symposium on glass science and technology, problems and prospects for 2004, Vienna, Austria, 1-5 Jul 1984)			
1	*See* UCRL-90827	DE84012263	MN -25	9:31267
CONF-840746-	(International symposium on current theories of plasticity and applications, Norman, OK, USA, 30 Jul-3 Aug 1984)			
1	*See* LA-UR-84-1492	DE84012627	MN -34	9:31394
CONF-840804-	(Intersociety energy conversion engineering conference, San Francisco, CA, USA, 19-24 Aug 1984)			
8	*See* LA-UR-84-1291	DE84011340	MN -97a	9:30970
17	*See* LA-UR-84-1673	DE84012444	MN -38	9:31417
CONF-840809-	(Geothermal Resources Council annual meeting, Reno, NV, USA, 27-29 Aug 1984)			
14	*See* LBL-17650	DE84012249	MN -66b	9:30585
CONF-840866-	(Conference on passive and low energy alternatives, Mexico City, Mexico, 6-11 Aug 1984)			
1	*See* LA-UR-84-1507	DE84012628	MN -59b	9:30557
CONF-840979-	(HP 1000 international users group conference, San Jose, CA, USA, 9-13 Sep 1984)			
1	*See* SAND-84-0565C	DE84012654	MN -32	9:31426
CONF-841076-	(9. international congress on rheology, Acapulco, Mexico, 8-13 Oct 1984)			
1	*See* LBL-17734	DE84012258	MN -4	9:31142
COO-				
2456/ 85	*See* DOE/ET/53016-T3	DE84012693	STD -20d	9:32352
CRC-				
537	*See* AD-A-136948/7			9:30251
CT-				
112.23A	*See* PB-84-145473			9:31821
CTO-				
2199	NTIS (US Sales Only), PC A04/MF A01; 1	DE84901207	MN -20	9:32333
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43100	Canadian Theses on Microfiche Service, National Library of Canada, Ottawa K1A 0N4		ND -34A	9:31872
46136	Canadian Theses on Microfiche Service, National Library of Canada, Ottawa, K1A 0N4		ND -34A	9:31873
46979	Canadian Theses on Microfiche Service, National Library of Canada, Ottawa, Canada, K1A 0N4	TI84701936	MN -34D	9:32266
48361	Canadian Theses on Microfiche Service, National Library of Canada, Ottawa, K1A 0N4	TI84701933	MN -34D	9:32267
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83048804	NTIS (US Sales Only); Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.			9:30809
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19	NTIS (US Sales Only), PC A06/MF A01	DE84780161	MN -34	9:31141
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T1	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84002228	MN -98	9:31724
DOE/BC/10083-				
19	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012937	STD -92a	9:30227
DOE/BP-				
208	NTIS, PC A03/MF A01 (GPO Dep.)	DE84009721	MN -59	9:30546
238	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84011674	MN -11	9:31725
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0068	NTIS, PC A02/MF A01 (GPO Dep.)	DE84008981	MN -58c	9:30547
0086	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011778	MN -95d	9:31055
DOE/CE/15149-				
T1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011726	MN -92a	9:30228
DOE/CE/30742-				
16	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84006982	MN -59a	9:30548
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T3	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012568	MN -2	9:32061
DOE/CH/00178-				
T21	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012208	MN -60	9:30595
T22	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012207	MN -58	9:30549
DOE/CL/01819-				
T3	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84013305	MN -79e	9:30862
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T2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011784	MN -95f	9:31084
DOE/CS/15077-				
T9	NTIS, PC A02/MF A01 (GPO Dep.)	DE84008581	MN -63	9:31453

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DOE/CS/30244-1	NTIS, PC A12/MF A01; 1 (GPO Dep.)	DE84011676	STD -59b	9:30550
DOE/CS/30581-T1	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE83016818	STD -59c	9:30551
DOE/CS/40117-T1	NTIS, PC A05/MF A01 (GPO Dep.)	DE84012823	MN -95d	9:31056
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DOE/CS/40289-T1	NTIS, PC A14/MF A01; 1 (GPO Dep.)	DE84012459	MN -95f	9:31085
DOE/CS/40397-T1	NTIS, PC A12; 3 (GPO Dep.)	DE84007870	MN -95f	9:31086
DOE/CS/60014-1	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012817	MN -95d	9:31058
DOE/CS/69023-T1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011208	MN -95	9:31136
DOE/CS/69104-6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012707	MN -95	9:31059
7	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012705	MN -95	9:31000
DOE/CS/83116-T1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011888	MN -63b	9:30509
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DOE/DP/40092-3	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012419	MN -21	9:32343
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DOE/DP/40124-32	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012533	MN -21	9:32301
34	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012487	MN -21	9:32346
36	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012488	MN -21	9:32302
37	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012392	MN -21	9:32347
38	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012391	MN -21	9:32303
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DOE/DP/40185-1	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012907	MN -21	9:32349
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DOE/EI/10142-T1	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012122	MN -88	9:30186
DOE/EIA-0130(84/ 03)	NTIS, PC A06/MF A01; 1 - GPO (GPO Dep.)	DE84012495	MN -98C	9:30257
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0340(83) / 1-Vol.1	NTIS, PC A07/MF A01 - GPO (GPO Dep.)	DE84012755	MN -92a	9:30241
0376(81)	NTIS, PC A09/MF A01 - GPO (GPO Dep.)	DE84012977	MN -98	9:30242
0383(83)	NTIS, PC A14/MF A01; 1 - GPO (GPO Dep.)	DE84012161	MN -98	9:31019
0385(83)	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012788	MN -98	9:30993
DOE/EIS-0031-F	NTIS, PC A15/MF A01; 1 (GPO Dep.)	DE84011246	MN -98E	9:31030
DOE/ER/03077-T1	NTIS, PC A10/MF A01; 1 (GPO Dep.)	DE84010731	MN -20	9:32350
DOE/ER/04974-6	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012232	MN -4	9:31248
DOE/ER/10013-1	NTIS, PC A11/MF A01; 1 (GPO Dep.)	DE84012289	MN -38	9:31378
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DOE/ER/10556-98	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012231	MN -38	9:31365
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DOE/ER/10978-7	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84007350	MN -34	9:31405
DOE/ER/13023-1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011505	MN -4	9:31328
DOE/ER/13097-1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012465	MN -34A	9:31874
DOE/ER/13114-1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012561	MN -48	9:31729
DOE/ER/40001-T2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012389	MN -34A	9:31875
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DOE/ER/52061-2	NTIS, PC A18/MF A01; 1 (GPO Dep.)	DE84011477	STD -20	9:32351
DOE/ER/53140-14	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012390	MN -20g	9:32304
DOE/ER/53162-3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012396	MN -20	9:32305
DOE/ER/60142-1	NTIS, PC A16/MF A01	DE83015574	STD -48	9:31753
DOE/ER/60155-1	NTIS, PC A13/MF A01; 1 (GPO Dep.)	DE84010592	MN -48	9:31765
DOE/ET/10137-T9	NTIS, PC A02/MF A01 (GPO Dep.)	DE84013281	STD -90d	9:30103
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T37-Vol.5	NTIS, PC A23/MF A01; 1 (GPO Dep.)	DE84010835	STD -90d	9:30108
T37-Vol.6	NTIS, PC A18/MF A01; 1 (GPO Dep.)	DE84010834	STD -90d	9:30109
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T37-Vol.8	NTIS, PC A17/MF A01; 1 (GPO Dep.)	DE84010832	STD -90d	9:30111
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DOE/ET/10491-T1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012821	MN -90	9:30096
DOE/ET/10532-T18	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012123	STD -90d	9:30113
DOE/ET/13397-20	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84010795	STD -90d	9:30114
DOE/ET/15492-T53	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84013184	MN -90i	9:30170
DOE/ET/15614-18	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012773	STD -90g	9:31044
DOE/ET/20209-T1	NTIS, PC A10/MF A01 (GPO Dep.)	DE84012196	MN -58	9:30507
DOE/ET/20590-T1	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012198	MN -61A	9:30510
DOE/ET/21007-5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011221	MN -62	9:30531
DOE/ET/27014-T12	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012504	STD -66a	9:30577
T13	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012548	MN -66a	9:30578
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DOE/ET/29246-T2	NTIS, PC A06/MF A01 (GPO Dep.)	DE84007558	MN -60	9:31382
DOE/ET/51013-117	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84010308	STD -20g	9:32306
DOE/ET/53016-T3	NTIS, PC A06/MF A01 (GPO Dep.)	DE84012693	STD -20d	9:32352
DOE/ET/53051-63	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84013054	STD -20f	9:32307
65	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84013103	STD -20f	9:32308
66	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012993	STD -20f	9:32309
DOE/ET/53088-132	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012527	MN -20f	9:32310
DOE/ET/60004-T6	NTIS, PC A14/MF A01; 1 (GPO Dep.)	DE84011239	MN -98	9:31024
DOE/EV-0005/ 37	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84011431	STD -70A	9:30320
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DOE/FE/05157-5	NTIS, PC A99/MF A01; 1 (GPO Dep.)	DE84012890	STD -90	9:30155
DOE/FE/60148-T2	NTIS, PC A12/MF A01; 1	DE84001690	STD -90a	9:30171
DOE/FE/60181-89	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012924	MN -90	9:30156
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91	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012923	MN -90	9:30157
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96	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012921	MN -90	9:30115
97	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012922	MN -90	9:30158
1602	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84012119	STD -90	9:30116

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T62	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012205	MN -66	9:30575
DOE/ID/12026-T4	NTIS, PC A02/MF A01 (GPO Dep.)	DE84013411	STD -66a	9:30581
DOE/ID/12079-90	NTIS, PC A06/MF A01 (GPO Dep.)	DE84012191	MN -66a	9:30582
DOE/ID/12129-T1	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012492	STD -97e	9:30492
DOE/IE-0003	NTIS, PC A10/MF A01; 1 (GPO Dep.)	DE84012894	MN -98E	9:31031
DOE/IG-0008/ 6	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830	TI84012394	STD -13	9:32394
0207	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012496	STD -70	9:30322
DOE/LC/10694-1519	NTIS, PC A04/MF A01; 1	DE84003019	STD -90c	9:30117
DOE/LC/10730-T1	NTIS, PC A11/MF A01; 1 (GPO Dep.)	DE84011242	STD -91	9:30264
DOE/LC/10821-T1	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84011216	STD -90a	9:30159
DOE/MC/16014-1573	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84009289	STD -90e	9:30216
DOE/MC/19163-T21	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012845	MN -90c	9:30118
DOE/MC/19207-1614	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012933	STD -90c	9:30119
DOE/MC/20013-T4	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012510	MN -92	9:30262
DOE/MC/20212-1570	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012947	STD -93	9:31046
DOE/MC/20342-1615	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012934	STD -92a	9:30253
DOE/METC-84-17	NTIS, PC A04/MF A01 (GPO Dep.)	DE84009290	STD -90e	9:31383
DOE/NBM-4012509	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012509	MN -2	9:32062
4012820	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012820	MN -95	9:31022
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4012849	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012849	MN -16	9:30395
4012912	NTIS, PC A20/MF A01 (GPO Dep.)	DE84012912	MN -90a	9:30120
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DOE/NE/44185-T1	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84011206	MN -38	9:31384
DOE/NV/10113-1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011788	MN -96	9:31137
DOE/OR/03054-22	NTIS, PC A04/MF A01 (GPO Dep.)	DE84012814	STD -89	9:30122
50	NTIS, PC A04/MF A01 (GPO Dep.)	DE84013337	STD -89	9:30123
50-App.A-Vol.1	NTIS, PC A23/MF A01; 1 (GPO Dep.)	DE84013324	STD -89	9:30124
50-App.A-Vol.3	NTIS, PC A12/MF A01; 1 (GPO Dep.)	DE84013326	STD -89	9:30125
50-App.B-Vol.1	NTIS, PC A19/MF A01; 1 (GPO Dep.)	DE84013338	STD -89	9:30126
50-App.C	NTIS, PC A11/MF A01; 1 (GPO Dep.)	DE84013328	STD -89	9:30127
50-App.D	NTIS, PC A99/MF A01; 1 (GPO Dep.)	DE84013329	STD -89	9:30128
50-App.E	NTIS, PC A10/MF A01; 1 (GPO Dep.)	DE84013330	STD -89	9:30129
50-App.F	NTIS, PC A16/MF A01; 1 (GPO Dep.)	DE84013331	STD -89	9:30130
50-App.G	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84013332	STD -89	9:30131
87	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012433	STD -89	9:30132
89	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012975	STD -89	9:30133
DOE/OR/21400-T7	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84010982	MN -20	9:32353
DOE/PC/30209-T6	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012211	MN -90d	9:30134
DOE/PC/30227-T3	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012061	STD -90a	9:31319
DOE/PC/30295-8	NTIS, PC A06; 1	DE84002176	STD -90e	9:30217
DOE/PC/30320-T4	NTIS, PC A10/MF A01 (GPO Dep.)	DE84007574	STD -90e	9:30172
DOE/PC/40068-T5-Vol.1	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84013196	STD -90i	9:30180
T5-Vol.2	NTIS, PC A14/MF A01; 1 (GPO Dep.)	DE84013197	STD -90i	9:30181
DOE/PC/40285-10	NTIS, PC A15/MF A01; 1 (GPO Dep.)	DE84008603	STD -90b	9:30213
DOE/PC/40771-11	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84006652	STD -90d	9:30456
DOE/PC/40774-T1	NTIS, PC A10/MF A01 (GPO Dep.)	DE84002414	STD -90d	9:30457
DOE/PC/40789-T10	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012744	STD -90i	9:30160
DOE/PC/50791-T3	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012075	STD -90d	9:30464
DOE/PC/50794-T2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84010691	STD -90c	9:30135
DOE/PC/50797-T6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012941	STD -90b	9:30162

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DOE/PC/50802-T1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012938	STD -90c	9:30136
DOE/PC/50813-5	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012802	MN -90a	9:30163
DOE/PC/60019-2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012953	STD -90d	9:30465
DOE/PC/60046-1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012287	STD -90d	9:30137
DOE/PC/60053-T3	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011493	MN -90d	9:30138
DOE/PC/60271-1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84006425	STD -90i	9:30651
T1	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011555	STD -90i	9:30652
DOE/PC/60799-1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84010863	STD -90a	9:30139
DOE/PC/60801-T2	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012212	STD -90e	9:31455
DOE/PC/60803-3	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012697	MN -90d	9:30140
DOE/PC/60804-T3	NTIS, PC A04; 3 (GPO Dep.)	DE84012751	MN -90d	9:30141
DOE/PC/60806-T1	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012286	STD -90b	9:30214
DOE/PC/63032-T3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012696	STD -90b	9:30142
DOE/R1/10849-1	NTIS MF A01; 2 (GPO Dep.)	DE84011595	MN -95	9:31060
DOE/R7/01024-T1	NTIS, PC A03; 3 (GPO Dep.)	DE84007748	MN -59b	9:30552
DOE/R7/01172-T1	NTIS, PC A04; 3 (GPO Dep.)	DE84010090	MN -13	9:30553
DOE/R7/01177-T1	NTIS, PC A03; 3 (GPO Dep.)	DE84010092	MN -95d	9:31061
DOE/R7/01239-T1	NTIS, PC A02; 3 (GPO Dep.)	DE84010455	MN -59a	9:30554
DOE/R7/01250-T1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84010438	MN -94d	9:30974
T2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84010439	MN -94d	9:30975
T3	NTIS, PC A05/MF A01; 1; 1 (GPO Dep.)	DE84010437	MN -94d	9:30976
DOE/R7/01251-T1	NTIS, PC A02; 3 (GPO Dep.)	DE84010436	MN -59a	9:30555
DOE/RA/23210-3	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012195	STD -97e	9:30493
DOE/RA/31029-T1	Energy Security Analysis, Washington, DC	TI84010419	ND -92	9:30243
DOE/RA/32012-T4	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84006949	STD -91	9:30268
T16	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84006899	STD -91	9:30269
T20	NTIS, PC A03/MF A01 (GPO Dep.)	DE84006946	STD -91	9:30265
DOE/RG/10347-T2	NTIS, PC A04/MF A01 (GPO Dep.)	DE84012148	MN -97	9:31032
T3	NTIS, PC A13/MF A01; 1 (GPO Dep.)	DE84012146	MN -97	9:32391
T4	NTIS, PC A19/MF A01; 1 (GPO Dep.)	DE84012194	MN -97	9:31009
DOE/RL/01830-T18	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012215	MN -60	9:30598
DOE/RW-83.089	*See* AERE-R-10506	DE84701715	MN -41	9:31338
DOE/SF/00515-T31	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012748	MN -28	9:31504
T32	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012481	MN -2	9:31505
DOE/SF/00700-T6	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012767	MN -62	9:30532
T7	NTIS, PC A13/MF A01; 1 (GPO Dep.)	DE84011307	MN -62	9:30533
DOE/SF/10501-010	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84008898	MN -62	9:30534
012	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84008956	MN -62	9:30535
DOE/SF/10539-08	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84011434	MN -62	9:30536
10	NTIS, PC A16; 3 (GPO Dep.)	DE84011437	MN -62	9:30537
14	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012608	MN -62	9:30538
15	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012980	MN -62	9:30539
18	NTIS, PC A12/MF A01; 1 (GPO Dep.)	DE84012462	MN -62	9:30540
DOE/SF/11724-T1	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84011893	STD -95e	9:31107
DOE/SF/11956-1	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012803	STD -66b	9:30583
DOE/SR/00001-T23	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011137	MN -80	9:30850
DOE/SWP-0001/ 2	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012757	MN -97	9:31033
DOE/TIC-3398-Suppl.1	NTIS,, $9.25	DE83017340	STD -2	9:32395
4628	NTIS, PC A04/MF A01; 1	DE82014444	STD -38	9:31366
4629	NTIS, PC A02/MF A01	DE82013735	STD -32	9:32435

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DOE/UMT-				
0217	NTIS, PC A05/MF A01 (GPO Dep.)	DE84013323	MN -70A	9:30323
DOT-I-				
82-20	NTIS, PC A03/MF A01; 1	TI84901213	MN -96	9:31073
82-37	NTIS, PC A05/MF A01; 1	DE84901218	MN -96	9:31074
82-38	NTIS, PC A08; 3	TI84901212	MN -96	9:31075
83-01	NTIS, PC A03/MF A01; 1	TI84901225	MN -96	9:31076
83-09	NTIS, PC A03/MF A01; 1	DE84901221	MN -96	9:31077
83-10	NTIS, PC A02/MF A01; 1	TI84901223	MN -95d	9:31062
83-11	NTIS, PC A06/MF A01; 1	TI84901224	MN -95d	9:31063
83-19	NTIS, PC A07/MF A01	TI84901214	MN -35	9:31020
83-26	NTIS, PC A06/MF A01; 1	TI84013589	MN -96	9:31078
83-39	NTIS, PC A04/MF A01; 1	TI84901222	MN -96	9:31079
DOT-P-				
30-81-06	GPO	TI84901219	MN -96	9:31080
DP-				
1680	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012830	STD -4	9:30294
DP-MS-				
84-35	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011513	MN -11	9:31707
84-49	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012564	MN -70	9:30833
DPST-				
82-472	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012422	MN -70	9:30324
DREO-TN-				
82-42	*See* AD-A-136663/2			9:30441
ECN-				
156	NTIS (US Sales Only), PC A02/MF A01; 1	DE84751589	MN -60	9:30599
EEB-L-				
83-09	*See* LBL-17394	DE84012572	MN -95d	9:31091
83-11	*See* LBL-17542	DE84012573	MN -13	9:31818
EEB-Vent-				
84-4	*See* LBL-17501	DE84012574	MN -95f	9:31067
EEB-W-				
84-01	*See* LBL-17330	DE84009628	MN -95d	9:31066
84-04	*See* LBL-17393	DE84012165	MN -59b	9:30558
EFI-				
539(26) -82	NTIS (US Sales Only), PC A02/MF A01	DE84701739	MN -37	9:31532
EGG-				
2302	*See* NUREG/CR-3360	DE84010550	MN -80	9:30797
2305	*See* NUREG/CR-3722	DE84011183	MN -80	9:30941
EGG-M-				
01284	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012642	MN -13	9:32396
01784	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012648	MN -13	9:32397
03884	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012652	MN -66e	9:30590
03984	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012646	MN -78	9:30846
04584	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012616	MN -95f	9:31087
04684	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011747	MN -70B	9:30389
05283	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84005031	MN -38	9:31420
06084	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012526	MN -32	9:32409
06284	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012538	MN -78	9:30864
06384	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012543	MN -78	9:30865
06484	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012615	MN -80	9:30866
06684	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012771	MN -80	9:30867
06784	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012770	MN -80	9:30868
08584	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012649	MN -38	9:31367
08784	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012537	MN -80	9:30824
10084	NTIS, PC A02; 3 (GPO Dep.)	DE84012525	MN -95f	9:31088
11684	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012536	MN -38	9:31421
13383	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012768	MN -79k	9:30763
13583	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012769	MN -79k	9:30764
15583	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012535	MN -95f	9:31089
17883	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012645	MN -78	9:30869
18283	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011749	MN -16	9:30396
19183	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012279	MN -70	9:30325
25983	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012647	MN -80	9:30825
27182	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012644	MN -41	9:31533
EGG-SCM-				
6577	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012483	MN -25	9:31148
EGG-TMI-				
6489	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012170	MN -78	9:31334
EGG-WM-				
6627	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012789	MN -70B	9:30326
EHD-				
82-81	NTIS (US Sales Only), PC A05/MF A01	DE84701857	MN -41	9:31734
EPA-				
450/ 3-82-011b	NTIS, PC A04/MF A01; 1	DE84901072	MN -11	9:31726
450/ 4-83-023	*See* PB-84-121383			9:30999
520/ 5-83-022	*See* PB-84-149384			9:31692
520/ 5-83-028	*See* PB-84-149145			9:31691
570/ 9-84-001	*See* ORNL/TM-8919	DE84012856	MN -11	9:31696
EPRI-AP-				
3495	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920333	ND -97	9:30611
3499	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920360	ND -90f	9:30143
3532	Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920412	ND -63e	9:30511

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EPRI-CS-				
3257	Electric Power Research Institute, 3412 Hillview Ave., Palo Alto, CA 94304	TI84920091	ND -90f	9:30653
3272	EPRI - Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920104	ND -90f	9:30612
3403-CCM	NTIS, PC A10/MF A01; 1 - EPRI (GPO Dep.)	DE84012053	MN -12	9:31677
3427	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920348	ND -90f	9:31456
3527	Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920392	ND -90	9:31416
EPRI-EA-				
1672-Vol.5	Electric Power Research Institute-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920320	ND -97b	9:31034
3193-Vol.1	Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920389	ND -11	9:30998
3464	EPRI-RRC Box 50490, Palo Alto, CA 94303	TI84920361	ND -97b	9:31035
3467	EPRI-RRC Box 50490, Palo Alto, CA 94303	TI84920328	ND -97b	9:31036
3484	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920401	ND -11	9:30683
3506	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920418	ND -97b	9:31037
3507-Vol.3	NTIS, PC A05/MF A01 - EPRI (GPO Dep.)	DE84012731	MN -97b	9:31038
3507-Vol.4	NTIS, PC A05/MF A01 - EPRI (GPO Dep.)	DE84012733	MN -97b	9:31039
3526-CCM	Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920374	ND -88	9:30200
3531	EPRI, Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920409	ND -98E	9:31040
EPRI-EL-				
3083	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920313	ND -97d	9:31385
3359-Vol.1	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920310	ND -97	9:30645
3359-Vol.2	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920311	ND -97d	9:30646
3397	EPRI-Research Reports Center, Box 50490 Palo Alto, CA 94303	TI84920404	ND -97a	9:30685
3415	Electric Power Research Institute-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920355	ND -97a	9:30686
3425-Vol.1	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920345	ND -97a	9:30687
3452	Electric Power Research Institute-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920357	ND -97b	9:30971
EPRI-EM-				
2995	NTIS, PC A06/MF A01; 1 - EPRI (GPO Dep.)	DE84012127	MN -94c	9:30978
3465	Electric Power Research Inst., Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920315	ND -25	9:31406
3529	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920394	ND -95	9:31108
3542	EPRI, Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920388	ND -59a	9:30556
3561	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920400	ND -97b	9:30434
EPRI-NP-				
2744	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920393	ND -80	9:30870
3068	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920395	ND -78	9:30715
3275-Vol.3	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920376	ND -78	9:30716
3372-Vol.1	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920402	ND -78	9:30717
3372-Vol.2	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920384	ND -80	9:30718
3372-Vol.3	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920424	ND -78	9:30719
3372-Vol.4	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920403	ND -78	9:30720
3380	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920410	ND -85	9:30300
3402-SR	Electric Power Research Institute, Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920343	ND -78	9:30693
3436	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920322	ND -80	9:32146
3444	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920411	ND -78	9:30698
3463	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920366	ND -78	9:30730
3468	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920423	ND -78	9:30699
3471	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920416	ND -78	9:30871
3476	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303; 1	TI84920330	ND -78	9:30844
3478	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920379	ND -78	9:30872
3480	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920336	ND -80	9:31012
3487	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920397	ND -78	9:30648
3490	EPRI-RRC, Box 50490, Palo Alto, CA 94303	TI84920382	ND -78	9:30700
3491	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920377	ND -78	9:30731
3517	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920405	ND -78	9:30701
3536-SR	EPRI-Research Reports Center, Box 50490, Palo Alto, CA 94303	TI84920406	ND -80	9:30702

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ERP/MSL-				
81-43(TR)	NTIS (US Sales Only), PC A02/MF A01	DE84701835	MN -86	9:30283
81-70(TR)	NTIS (US Sales Only), PC A02/MF A01	DE84701848	MN -41	9:30284
81-128(TR)	NTIS (US Sales Only), PC A02/MF A01	DE84701847	MN -41	9:30285
81-138(TR)	NTIS (US Sales Only), PC A02/MF A01	DE84701833	MN -86	9:30286
ESL-				
108	*See* DOE/ID/12079-90	DE84012191	MN -66a	9:30582
ESN-				
38-1	*See* AD-A-136868/7			9:32402
FE-				
2247-36	*See* DOE/ET/10137-T9	DE84013281	STD -90d	9:30103
2315-102	*See* DOE/ET/10532-T18	DE84012123	STD -90d	9:30113
FE-MIT-				
60799-1	*See* DOE/PC/60799-1	DE84010863	STD -90a	9:30139
FEI-				
1289	NTIS (US Sales Only), PC A02/MF A01	DE84701735	MN -37	9:32239
1407	NTIS (US Sales Only), PC A02/MF A01	DE84701893	MN -37	9:31615
1416	NTIS (US Sales Only), PC A02/MF A01	DE84701894	MN -37	9:31534
FERC/DEIS-				
0038-Vol.1	NTIS, PC A16/MF A01; 1 (GPO Dep.)	DE84012090	MN -97e	9:30495
0038-Vol.2	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012089	MN -97e	9:30496
0038-Vol.3	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012088	MN -97e	9:30497
0038-Vol.4	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84012087	MN -97e	9:30498
0038-Vol.5	NTIS, PC A11/MF A01; 1 (GPO Dep.)	DE84012086	MN -97e	9:30499
0038-Vol.6	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012085	MN -97e	9:30500
0038-Vol.7	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012084	MN -97e	9:30501
FERMILAB-CONF-				
84/ 33-T	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012468	MN -34D	9:31982
FERMILAB/TM-				
1259	NTIS, PC A04/MF A01 (GPO Dep.)	DE84012518	MN -28	9:31525
1261	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012521	MN -28	9:31471
FMI-RR-				
84	NTIS (US Sales Only), PC A04/MF A01; 1	DE84751459	MN -11	9:31652
FRNC-TH-				
1515	NTIS (US Sales Only), PC A08; 3	DE84751550	MN -60	9:30600
1518	NTIS (US Sales Only), PC A09; 3	DE84751542	MN -59	9:30564
1520	NTIS (US Sales Only), PC A09; 3	DE84751546	MN -62	9:30541
1522	NTIS (US Sales Only), PC A09; 3	DE84751544	MN -63	9:30525
1523	NTIS (US Sales Only), PC A05; 3	DE84751548	MN -63	9:30512
1533	NTIS (US Sales Only), PC A09; 3	DE84751543	MN -94a	9:30973
1534	NTIS (US Sales Only), PC A08; 3	DE84751545	MN -63	9:30526
FSEC-CR-				
90-83	NTIS, PC A07/MF A01; 1	DE84901372	MN -95d	9:31064
FSEC-RD-				
79-2-Pt.1	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012197	MN -59a	9:30565
79-2-Pt.2	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012201	MN -59a	9:30566
FWS/OBS-				
80/ 40.12	*See* PB-83-141564	TI84901186	MN -11	9:31709
80/ 40.13	*See* PB-84-120005	TI84901195	MN -11	9:31710
82/ 32	NCET-US Fish and Wildlife Service-1010 Gause Blvd., Slidell, LA 70458	TI84901127	MN -11	9:31699
82/ 65	*See* PB-84-144138			9:31701
83/ 23	NCET-US Fish and Wildlife Service-1010 Gause Blvd., Slidell, LA 70458	TI84901129	MN -11	9:31700
GA-A-				
17334	NTIS, PC A05; 3 (GPO Dep.)	DE84009098	STD -95f	9:31090
17469	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012180	MN -77	9:30745
17528	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012471	MN -20a	9:32311
GAO/AFMD-				
84-13	US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760	TI84901122	MN -11	9:30990
GAO/IMTEC-				
83-5	US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760	TI84901192	MN -32	9:30244
GAO/RCED-				
84-50	US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760	TI84901112	MN -41	9:31013
84-53	US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760	TI84901115	MN -11	9:31723
84-63	General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20760	TI84901116	MN -13	9:31001
84-92	US General Accounting Office, PO Box 6015, Gaithersburg, MD 20760	TI84901123	MN -98B	9:30225
84-111	General Accounting Office, P.O. Box 6015, Gaithersburg, MD 20760	TI84901109	MN -2	9:30333
GEPP-TIS-				
802	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012371	MN -13	9:32312
GESER-				
018	NTIS (US Sales Only), PC A03/MF A01; 1	DE84751549	MN -62	9:30542
GESP-				
695-Vol.1	*See* N-76-18258	TI84901105	MN -38	9:31422
GJBX-				
40(83)	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830	TI84002619	ND -51	9:30279
GSCan-P-				
81-23	NTIS (US Sales Only), PC A09/MF A01	DE84701838	MN -51	9:30280

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GSF-OE-				
721	110M Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Attaching, Germany, F.R.; 1	TI84751257	MN -41	9:31685
GTFR-				
44	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84008858	MN -20b	9:32354
46	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84008855	MN -20a	9:32313
47	NTIS, PC A02/MF A01 (GPO Dep.)	DE84008014	MN -20g	9:32314
HEDL-				
7405	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012368	MN -80	9:31149
7448	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84012370	MN -78	9:30703
7449	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84012385	MN -78	9:30704
HEDL-SA-				
3014FP	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011805	MN -38	9:31386
3054-FP	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012416	MN -79a	9:30765
3055	NTIS, PC A02/MF A01 (GPO Dep.)	DE84007169	MN -78	9:30873
3066-FP	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012378	MN -79	9:30847
3077-FP	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012379	MN -38	9:31387
HRP-				
0904746/ 5	NTIS, PC A03/MF A01			9:31735
0904747/ 3	NTIS, PC A02/MF A01			9:31807
IA-				
119/ 83	*See* OEFZS-4246	DE84701860	MN -23	9:30417
IAE-				
3676/ 2	NTIS (US Sales Only), PC A02/MF A01	DE84701879	MN -37	9:31535
3784/ 14	NTIS (US Sales Only), PC A02/MF A01	DE84701880	MN -37	9:31536
IAEA-R-				
2208-F	NTIS (US Sales Only), PC A07/MF A01	DE84701846	MN -48	9:31744
2467-F	NTIS (US Sales Only), PC A08/MF A01	DE84701731	MN -80	9:30818
2477-F	NTIS (US Sales Only), PC A03/MF A01	DE84701843	MN -48	9:31742
2503-F	NTIS (US Sales Only), PC A02/MF A01	DE84701859	MN -48	9:31730
2575-F	NTIS (US Sales Only), PC A04/MF A01	DE84701899	MN -70	9:30334
2717-F	NTIS (US Sales Only), PC A02/MF A01	DE84701842	MN -11	9:30182
3024-F	NTIS (US Sales Only), PC A03/MF A01	DE84701732	MN -78	9:30290
3197-F	NTIS (US Sales Only), PC A02/MF A01	DE84701844	MN -48	9:31743
IAEA-RL-				
107	NTIS (US Sales Only), PC A03/MF A01	DE84701877	MN -37	9:31388
108	NTIS (US Sales Only), PC A03/MF A01	DE84701845	MN -23	9:31690
IAEA-TC-				
518/ 4	*See* DP-MS-84-49	DE84012564	MN -70	9:30833
IAEA-TECDOC-				
280	NTIS (US Sales Only), PC A14/MF A01	DE84780374	MN -34C	9:32438
293	NTIS (US Sales Only), PC A04/MF A01	DE84701912	MN -2	9:31010
296	NTIS (US Sales Only), PC A04/MF A01	DE84701849	MN -41	9:30385
300	NTIS (US Sales Only), PC A09/MF A01	DE84701895	MN -37	9:31623
IC-				
82/ 178	NTIS (US Sales Only), PC A02/MF A01	DE84701746	MN -32	9:32411
83/ 37	NTIS (US Sales Only), PC A03/MF A01	DE84701747	MN -32	9:32412
IEA/EAS-				
E3/ 82/ 4	NTIS (US Sales Only), PC A05/MF A01	DE84901381	STD -90d	9:30144
G4	NTIS (US Sales Only), PC A05/MF A01	DE84901050	STD -90j	9:30218
IFE/KR/E-				
4	NTIS (US Sales Only), PC A08/MF A01; 1	DE84751456	MN -13	9:30994
IFP-				
31-152	NTIS (US Sales Only), PC A08/MF A01; 1	DE84751540	MN -92	9:30233
31-316	NTIS (US Sales Only), PC A08/MF A01; 1	DE84751541	MN -92a	9:30226
31-574	NTIS (US Sales Only), PC A10/MF A01; 1	DE84751358	MN -61G	9:30484
IFT-T-				
10/ 82	NTIS (US Sales Only), PC A08/MF A01	DE84701763	MN -34D	9:32045
IFVE-OEA-				
83-18	NTIS (US Sales Only), PC A02/MF A01	DE84701896	MN -37	9:31431
83-104	NTIS (US Sales Only), PC A02/MF A01	DE84701866	MN -28	9:31506
IFVE-OEF-				
83-17	NTIS (US Sales Only), PC A02/MF A01	DE84701809	MN -34D	9:31983
83-81	NTIS (US Sales Only), PC A02/MF A01	DE84701803	MN -34D	9:31984
83-94	NTIS (US Sales Only), PC A02/MF A01	DE84701804	MN -34D	9:31985
83-109	NTIS (US Sales Only), PC A02/MF A01	DE84701802	MN -34D	9:31986
IFVE-ONF-				
83-112	NTIS (US Sales Only), PC A02/MF A01	DE84701881	MN -37	9:31542
83-113	NTIS (US Sales Only), PC A02/MF A01	DE84701882	MN -37	9:31543
IFVE-OTF-				
82-203	NTIS (US Sales Only), PC A02/MF A01	DE84701784	MN -34D	9:32014
83-26	NTIS (US Sales Only), PC A02/MF A01	DE84701785	MN -34D	9:32015
INDC(IRN)-				
003/ L	NTIS (US Sales Only), PC A02/MF A01	DE84701829	MN -34C	9:32147
INFN/BE-				
80/ 4	NTIS (US Sales Only), MF A01; 2	DE84901165	MN -34C	9:32067
INFO-				
0082	NTIS (US Sales Only), PC A02/MF A01	DE84701906	MN -2	9:30390
0085	NTIS (US Sales Only), PC A03/MF A01	DE84701904	MN -2	9:30874
0086	NTIS (US Sales Only), PC A02/MF A01	DE84701900	MN -70	9:30391
INIS-BR-				
95	NTIS (US Sales Only), PC A25/MF A01	DE84780120	MN -25	9:30796
INIS-mf-				
4754(No.23)	NTIS (US Sales Only), PC A04/MF A01	DE84780366	MN -20	9:32315
8033	NTIS (US Sales Only), PC A02/MF A01	DE84780210	MN -2	9:31784

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8339	NTIS (US Sales Only), PC A05/MF A01	TI84701915	MN -34A	9:32240
8342	NTIS (US Sales Only), PC A04/MF A01	TI84701919	MN -34A	9:31877
8344	NTIS (US Sales Only), PC A04/MF A01	TI84701916	MN -34A	9:32241
8347	NTIS (US Sales Only), PC A07/MF A01	TI84780232	MN -34C	9:32158
8349	NTIS (US Sales Only), PC A07/MF A01	TI84701917	MN -34A	9:32097
8350	NTIS (US Sales Only), PC A04/MF A01	TI84701918	MN -34A	9:31878
8354	NTIS (US Sales Only), PC A03/MF A01	TI84780231	MN -34D	9:32016
8365	NTIS (US Sales Only), PC A09/MF A01	DE84780230	MN -34D	9:32063
8619	NTIS (US Sales Only), PC A02/MF A01	DE84780213	MN -2	9:30786
8695	NTIS (US Sales Only), PC A07/MF A01	DE84780122	MN 93	9:31785
8708	NTIS (US Sales Only), PC A06/MF A01	DE84780226	MN -34D	9:31987
8714	NTIS (US Sales Only), PC A07/MF A01	DE84780265	MN -78	9:30732
8715	NTIS (US Sales Only), PC A06/MF A01	DE84780225	MN -34D	9:32017
8717	NTIS (US Sales Only), PC A06/MF A01	TI84780266	MN -70	9:31843
8719	NTIS (US Sales Only), PC A04/MF A01	DE84780228	MN -34C	9:32183
8723	NTIS (US Sales Only), PC A11/MF A01	DE84780281	MN -48	9:31736
8724	NTIS (US Sales Only), PC A07/MF A01	DE84780278	MN -48	9:31786
8727	NTIS (US Sales Only), PC A03/MF A01	DE84780279	MN -23	9:31745
8728	NTIS (US Sales Only), PC A03/MF A01	DE84780280	MN -23	9:31746
8729	NTIS (US Sales Only), PC A03/MF A01	DE84780282	MN -48	9:31737
8730	NTIS (US Sales Only), PC A06/MF A01	DE84780227	MN -34C	9:32184
8732	NTIS (US Sales Only), PC A06/MF A01	DE84780286	MN -2	9:31738
8733	NTIS (US Sales Only), PC A08/MF A01	DE84780284	MN -2	9:30787
8736	NTIS (US Sales Only), PC A07/MF A01	DE84780283	MN -23	9:32256
8739	NTIS (US Sales Only), PC A06/MF A01	DE84780277	MN -34C	9:32139
8740	NTIS (US Sales Only), PC A05/MF A01	DE84780369	MN -25	9:31172
8741	NTIS (US Sales Only), PC A06/MF A01	DE84780365	MN -34A	9:31173
8742	NTIS (US Sales Only), PC A04/MF A01	DE84780370	MN -48	9:31739
8745	NTIS (US Sales Only), PC A15/MF A01	DE84780371	MN -2	9:30845
8746	NTIS (US Sales Only), PC A05/MF A01	DE84780368	MN -34C	9:32185
8753	NTIS (US Sales Only), PC A02/MF A01	DE84701937	MN -34D	9:32052
8755	NTIS (US Sales Only), PC A03/MF A01	DE84780367	MN -34D	9:32053
8759	NTIS (US Sales Only), PC A02/MF A01	DE84702053	MN -34D	9:32272
8760	NTIS (US Sales Only), PC A02/MF A01	DE84702054	MN -34D	9:32273
8901	NTIS (US Sales Only), PC A14/MF A01	TI84701920	MN -34A	9:31905
8906	NTIS (US Sales Only), PC A02/MF A01	DE84780216	MN -2	9:30397
8908	NTIS (US Sales Only), PC A02/MF A01	DE84780214	MN -2	9:30788
8910	NTIS (US Sales Only), PC A02/MF A01	DE84780215	MN -2	9:30789
8914	NTIS (US Sales Only), PC A03/MF A01	DE84780211	MN -2	9:30875
8916	NTIS (US Sales Only), PC A02/MF A01	DE84780212	MN -2	9:30876
8919	NTIS (US Sales Only), PC A02/MF A01	DE84780206	MN -2	9:30398
8921	NTIS (US Sales Only), PC A05/MF A01	DE84780235	MN -34A	9:31861
8925	NTIS (US Sales Only), PC A03/MF A01	DE84780285	MN -2	9:31014
8931	NTIS (US Sales Only), PC A02/MF A01	DE84780209	MN -2	9:30790
8939	NTIS (US Sales Only), PC A06/MF A01	DE84701779	MN -34A	9:31906
8940	NTIS (US Sales Only), PC A10/MF A01	DE84780268	MN -34A	9:31907
8944	NTIS (US Sales Only), PC A07/MF A01	DE84780271	MN -34A	9:31908
8951	NTIS (US Sales Only), PC A04/MF A01	DE84701934	MN -34D	9:32274
8954	NTIS (US Sales Only), PC A03/MF A01	DE84701935	MN -34D	9:32275
8955	NTIS (US Sales Only), PC A03/MF A01	DE84701755	MN -34D	9:32276
8958	NTIS (US Sales Only), PC A06/MF A01	DE84780270	MN -34A	9:31909
8965	NTIS (US Sales Only), PC A03/MF A01	DE84780287	MN -2	9:30766
8967	NTIS (US Sales Only), PC A03/MF A01	DE84780372	MN -2	9:30392
8968	NTIS (US Sales Only), PC A12/MF A01	DE84780269	MN -34A	9:31918
INIS-SU-				
203	NTIS (US Sales Only), PC A06/MF A01	DE84780155	MN -34A	9:31259
212	NTIS (US Sales Only), PC A06/MF A01	DE84780224	MN -34A	9:32060
219	NTIS (US Sales Only), PC A14/MF A01	DE84780219	MN -20	9:32357
IS-M-				
463-Rev.1	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012139	MN -90n	9:30164
465	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012837	MN -25	9:31196
466	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012835	MN -34	9:31391
467	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012836	MN -28	9:32247
468	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012871	MN -34	9:31392
469	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012834	MN -4	9:31288
471	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012831	MN -4	9:31289
474	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012833	MN -25	9:31197
478	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012840	MN -90i	9:30173
IS-T-				
1111(Rev.1)	NTIS, PC A09/MF A01 (GPO Dep.)	DE84011487	MN -4	9:31322
ISPO-				
209-Vol.1	*See* UCRL-53506-Vol.1	DE84012999	STD -15	9:31295
209-Vol.2	*See* UCRL-53506-Vol.2	DE84013000	STD -15	9:31296
ITEF-				
4(1983)	NTIS (US Sales Only), PC A03/MF A01	DE84701883	MN -37	9:31626
IWGFPT-				
3	NTIS (US Sales Only), PC A07/MF A01; 1	DE84900850	MN -78	9:30819
14	NTIS (US Sales Only), PC A11/MF A01; 1	DE84900986	MN -78	9:30820
JINR-				
1-83-22	NTIS (US Sales Only), PC A02/MF A01	DE84701699	MN -34C	9:32142
5-83-244	NTIS (US Sales Only), PC A02/MF A01	DE84701749	MN -32	9:32413
6-83-235	NTIS (US Sales Only), PC A02/MF A01	DE84701700	MN -34C	9:32123
6-83-454	NTIS (US Sales Only), PC A02/MF A01	DE84701885	MN -37	9:31612
8-83-45	NTIS (US Sales Only), PC A02/MF A01	DE84701861	MN -28	9:31550
8-83-191	NTIS (US Sales Only), PC A02/MF A01	DE84701783	MN -34A	9:31508

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9-83-24	NTIS (US Sales Only), PC A02/MF A01	DE84701726	MN -28	9:31474
9-83-536	NTIS (US Sales Only), PC A02/MF A01	DE84701862	MN -28	9:31475
10-83-194	NTIS (US Sales Only), PC A02/MF A01	DE84701743	MN -37	9:31407
10-83-538	NTIS (US Sales Only), PC A02/MF A01	DE84701897	MN -37	9:31551
13-83-37	NTIS (US Sales Only), PC A02/MF A01	DE84701738	MN -37	9:31552
13-83-436	NTIS (US Sales Only), PC A02/MF A01	DE84701884	MN -37	9:31553
14-83-444	NTIS (US Sales Only), PC A02/MF A01	DE84701837	MN -25	9:31198
18-82-65	NTIS (US Sales Only), PC A02/MF A01	DE84701725	MN -28	9:31509
E-1-83-84	NTIS (US Sales Only), PC A02/MF A01	DE84701820	MN -34C	9:32223
E-1-83-487	NTIS (US Sales Only), PC A02/MF A01	DE84701826	MN -34C	9:32087
E-2-83-177	NTIS (US Sales Only), PC A02/MF A01	DE84701786	MN -34D	9:32019
E-19-83-156	NTIS (US Sales Only), PC A02/MF A01	DE84701712	MN -48	9:31788
R-1-83-201	NTIS (US Sales Only), PC A02/MF A01	DE84701694	MN -34C	9:32124
R-1-83-327	NTIS (US Sales Only), PC A02/MF A01	DE84701695	MN -34C	9:32088
R-1-83-328	NTIS (US Sales Only), PC A02/MF A01	DE84701736	MN -37	9:31554
R-1-83-431	NTIS (US Sales Only), PC A02/MF A01	DE84701696	MN -34C	9:32089
R-1-83-432	NTIS (US Sales Only), PC A02/MF A01	DE84701697	MN -34C	9:31990
R-2-83-490	NTIS (US Sales Only), PC A02/MF A01	DE84701787	MN -34D	9:32020
R-3-83-532	NTIS (US Sales Only), PC A02/MF A01	DE84701821	MN -34C	9:32224
R-4-83-110	NTIS (US Sales Only), PC A02/MF A01	DE84701822	MN -34C	9:32225
R-4-83-411	NTIS (US Sales Only), PC A02/MF A01	DE84701823	MN -34C	9:32226
R-5-83-398	NTIS (US Sales Only), PC A02/MF A01	DE84701753	MN -34D	9:32279
R-7-83-91	NTIS (US Sales Only), PC A02/MF A01	DE84701698	MN -34C	9:32152
R-9-82-926	NTIS (US Sales Only), PC A02/MF A01	DE84701721	MN -28	9:31493
R-9-83-32	NTIS (US Sales Only), PC A02/MF A01	DE84701723	MN -28	9:31510
R-9-83-238	NTIS (US Sales Only), PC A02/MF A01	DE84701722	MN -28	9:31511
R-9-83-394	NTIS (US Sales Only), PC A02/MF A01	DE84701724	MN -28	9:31494
R-10-83-77	NTIS (US Sales Only), PC A02/MF A01	DE84701748	MN -32	9:32414
R-10-83-175	NTIS (US Sales Only), PC A02/MF A01	DE84701720	MN -28	9:31512
R-12-83-330	NTIS (US Sales Only), PC A02/MF A01	DE84701706	MN -4	9:31290
R-13-82-901	NTIS (US Sales Only), PC A02/MF A01	DE84701727	MN -28	9:31555
R-13-82-902	NTIS (US Sales Only), PC A02/MF A01	DE84701737	MN -37	9:31556
R-13-83-355	NTIS (US Sales Only), PC A02/MF A01	DE84701742	MN -37	9:31627
JINR-D-				
2-82-568	NTIS (US Sales Only), PC A09/MF A01	DE84780158	MN -34C	9:32065
9-82-664	NTIS (US Sales Only), PC A10/MF A01	DE84780156	MN -28	9:31477
JINR-R-				
1-2-13-83-81	NTIS (US Sales Only), PC A08/MF A01	DE84780157	MN -34D	9:31557
4-83-498	NTIS (US Sales Only), PC A02/MF A01	DE84701771	MN -34A	9:31951
K/OA-				
5643	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012853	MN -2	9:30399
K/SUB-				
81-9039/ 3	NTIS, PC A07/MF A01; 1 (GPO Dep.)	DE84011539	MN -41	9:31808
KFA-STE-IB-				
3/ 82	NTIS (US Sales Only), PC A07/MF A01; 1	DE84751252	MN -98G	9:31021
KFKI-				
1983-60	NTIS (US Sales Only), PC A02/MF A01	DE84701729	MN -25	9:30767
1983-74	NTIS (US Sales Only), PC A02/MF A01	DE84701717	MN -23	9:32248
1983-91	NTIS (US Sales Only), PC A02/MF A01	DE84701707	MN -4	9:31361
LA-				
9933-C-Vol.1	NTIS, PC A23/MF A01; 1 (GPO Dep.)	DE84004529	STD -34	9:31991
9933-C-Vol.2	NTIS, PC A23/MF A01 (GPO Dep.)	DE84004473	STD -34	9:31992
LA-tr-				
81-8	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE81026012	MN -4	9:31306
81-12	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE81030651	MN -34	9:31236
82-2	NTIS, PC A02/MF A01 (GPO Dep.)	DE82014226	MN -86	9:30409
82-3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014225	MN -10	9:30292
82-4	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014224	MN -46	9:31311
82-5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014223	MN -37	9:31611
82-6	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014235	MN -10	9:30411
82-7	NTIS, PC A02/MF A01 (GPO Dep.)	DE82014234	MN -10	9:31308
82-8	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014233	MN -10	9:30412
82-9	NTIS, PC A02/MF A01 (GPO Dep.)	DE82014232	MN -10	9:31307
82-10	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014231	MN -10	9:31310
82-11	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014230	MN -4	9:30408
82-12	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014329	MN -10	9:31309
82-13	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014328	MN -10	9:30414
82-14	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014327	MN -10	9:30413
82-15	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014326	MN -10	9:31312
82-16	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82014325	MN -10	9:30410
82-23	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE82016822	MN -34	9:31635
83-3	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011730	MN -4	9:31247
83-5	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012559	MN -45	9:31639
83-28	NTIS, PC A02/MF A01 (GPO Dep.)	DE84004465	MN -86	9:30299
84-14-Pt.1	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012863	MN -25	9:31245
84-15-Pt.2	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012864	MN -25	9:31246
LA-UR-				
79-1044-App.	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84010040	MN -38	9:30972
83-3085	NTIS, PC A03/MF A01	DE84001722	MN -32	9:32415
84-182	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84006021	MN -4	9:30435
84-232	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84006026	MN -4	9:30436
84-232-Rev.	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84007496	MN -4	9:30437
84-344	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84006032	MN -34	9:32294
84-348	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84006033	MN -97c	9:30649
84-877	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84010070	MN -25	9:31199

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84-890	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84010067	MN -38	9:31393
84-1075	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84009992	MN -20d	9:32358
84-1077	NTIS, PC A02/MF A01 (GPO Dep.)	DE84009996	MN -20f	9:32317
84-1185	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011374	MN -38	9:31432
84-1291	NTIS, PC A02; 3 (GPO Dep.)	DE84011340	MN -97a	9:30970
84-1413	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012659	MN -21	9:32359
84-1415	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012658	MN -11	9:31643
84-1424	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012660	MN -34A	9:31952
84-1426	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012663	MN -66i	9:30584
84-1436	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012665	MN -15	9:30400
84-1437	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012664	MN -15	9:30401
84-1492	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012627	MN -34	9:31394
84-1504	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012625	MN -34B	9:31870
84-1505	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012629	MN -34D	9:32295
84-1507	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012628	MN -59b	9:30557
84-1513	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012630	MN -15	9:30402
84-1516	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012633	MN -15	9:30403
84-1523	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012631	MN -41	9:31640
84-1526	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012635	MN -38	9:31368
84-1558	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012636	MN -91	9:30266
84-1559	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012640	MN -33A	9:30877
84-1566	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012441	MN -34C	9:32227
84-1574	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012440	MN -32	9:32416
84-1620	NTIS, PC A02; 3 (GPO Dep.)	DE84012437	MN -78	9:30878
84-1621	NTIS, PC A02; 3 (GPO Dep.)	DE84012448	MN -25	9:31200
84-1623	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012449	MN -34	9:32228
84-1626	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012450	MN -28	9:31513
84-1640	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012453	MN -34B	9:31863
84-1647	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012454	MN -11	9:30343
84-1649	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012455	MN -78	9:30879
84-1650	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012456	MN -78	9:30733
84-1662	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012457	MN -48	9:31829
84-1663	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012584	MN -48	9:31830
84-1666	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012583	MN -34B	9:31864
84-1667	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012442	MN -34B	9:31865
84-1673	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012444	MN -38	9:31417
84-1705	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012581	MN -38	9:31418
84-1722	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012586	MN -28	9:31514
84-1723	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012587	MN -41	9:31641
84-1734	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012577	MN -34A	9:31953
LBL-				
14270	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012250	MN -66a	9:30591
16369	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012260	MN -95d	9:31065
16793	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012310	MN -48	9:31789
16979	NTIS, PC A02/MF A01; 1	DE84012259	MN -20a	9:32360
17293	NTIS, PC A02/MF A01 (GPO Dep.)	DE84009223	MN -34	9:31264
17330	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84009628	MN -95d	9:31066
17349	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011817	MN -28	9:31515
17393	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012165	MN -59b	9:30558
17394	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012572	MN -95d	9:31091
17431	NTIS, PC A04/MF A01 (GPO Dep.)	DE84012740	MN -41	9:31790
17487	NTIS, PC A02; 3 (GPO Dep.)	DE84012054	MN -4	9:31362
17501	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012574	MN -95f	9:31067
17542	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012573	MN -13	9:31818
17611	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012166	MN -4	9:31954
17623	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012253	MN -4	9:30438
17624	NTIS, PC A07/MF A01 (GPO Dep.)	DE84012575	MN -21	9:32361
17650	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012249	MN -66b	9:30585
17668	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011874	MN -38	9:31457
17688	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011581	MN -34D	9:32021
17715	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011804	MN -4	9:32280
17720	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012255	MN -34C	9:32099
17734	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012258	MN -4	9:31142
17741	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012248	MN -94c	9:30979
17759	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012317	MN -28	9:31955
17769	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012261	MN -4	9:30234
17775	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012316	MN -28	9:31408
17782	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012246	MN -11	9:31653
17795	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012307	MN -34D	9:31993
17802	NTIS, PC A02; 3 (GPO Dep.)	DE84012312	MN -25	9:31265
17820	NTIS, PC A08/MF A01 (GPO Dep.)	DE84012306	MN -34A	9:31956
LUIP-				
8311	NTIS (US Sales Only), PC A05/MF A01	DE84701810	MN -34D	9:31994
LUNFD6/NFFK-				
7034/ 1-27(1983)	*See* LUIP-8311	DE84701810	MN -34D	9:31994
MCR-				
81-1708A	*See* DOE/SF/10539-08	DE84011434	MN -62	9:30536
MHD-III-				
84-045	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011842	STD -90g	9:31045
MHSMP-				
84-19	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012997	MN -45	9:31636
MINTEK-M-				
76	NTIS (US Sales Only), PC A02/MF A01	DE84701701	MN -4	9:31291
MIT-EL-				
83-015	*See* PB-84-145895			9:31678

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83-015-ES	*See* PB-84-145911			9:31680
MLM-				
3148(OP)	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012398	MN -16	9:31292
3153(OP)	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012397	MN -4	9:31637
3154(OP)	NTIS, PC A02/MF 01 (GPO Dep.)	DE84012425	MN -45	9:31638
3155(OP)	NTIS, PC A02; 3 (GPO Dep.)	DE84012367	MN -15	9:30404
MRP/MRL-				
82-3(TR)	NTIS (US Sales Only), PC A02/MF A01	DE84701887	MN -37	9:31558
82-19(TR)	NTIS (US Sales Only), PC A03/MF A01	DE84701851	MN -41	9:30386
82-24(TR)	NTIS (US Sales Only), PC A02/MF A01	DE84701886	MN -37	9:31559
82-36(TR)	NTIS (US Sales Only), PC A03/MF A01	DE84701888	MN -37	9:31560
MRP/MSL-				
81-17(TR)	NTIS (US Sales Only), PC A03/MF A01	DE84701852	MN -41	9:30344
MST-LUFT-A-				
77	NTIS (US Sales Only), PC A04/MF A01; 1	DE84751454	MN -11	9:31654
N-				
76-18258	NTIS, PC A13/MF A01; 1	TI84901105	MN -38	9:31422
NASA/CR-				
3339	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012298	MN -63	9:30527
3345	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012301	MN -63	9:30528
3372	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012296	MN -63	9:31428
134816-Vol.1	*See* N-76-18258	TI84901105	MN -38	9:31422
NBS/FIPS/PUB-				
60-2	NTIS, PC A06/MF A01	TI84900961	MN -32	9:32417
104	NTIS, PC A03/MF A01	TI84900966	MN -13	9:32439
ND-R-				
892(R)	NTIS (US Sales Only), PC A02/MF A01	DE84701733	MN -78	9:30810
NII-				
01Suppl.11	NTIS (US Sales Only), PC A02/MF A01	DE84701873	MN -78	9:30880
01Suppl.12	NTIS (US Sales Only), PC A03/MF A01	DE84701874	MN -78	9:30881
01(suppl.13)	NTIS (US Sales Only), PC A02/MF A01	DE84701875	MN -78	9:30882
NIIAR-				
50(565)	NTIS (US Sales Only), PC A02/MF A01	DE84701834	MN -86	9:30297
NIM-				
2011	NTIS (US Sales Only), PC A04/MF A01	DE84701702	MN -4	9:31293
NMERDI-				
2-71-4604	NTIS, PC A06/MF A01; 1	TI84901080	MN -91	9:30270
NP-				
4751453	NTIS (US Sales Only), PC A12/MF A01; 1; 1	DE84751453	MN -92	9:30260
4751457	NTIS (US Sales Only), PC A05/MF A01	DE84751457	MN -97	9:30688
4751458	NTIS (US Sales Only), PC A04/MF A01	DE84751458	MN -97	9:31429
4770280	NTIS (US Sales Only), PC A04/MF A01; 1	DE84770280	MN -11	9:31809
4770280	*See* NP-4770280	DE84770280	MN -11	9:31809
4770282	NTIS (US Sales Only), PC A02/MF A01	DE84770282	MN -13	9:30991
4770283	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770283	MN -13	9:30247
4770284	NTIS (US Sales Only), PC A03/MF A01; 1	DE84770284	MN -13	9:30995
4770285	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770285	MN -88	9:30201
4770286	NTIS (US Sales Only), PC A02/MF A01	DE84770286	MN -88	9:30202
4770287	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770287	MN -88	9:30222
4770288	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770288	MN -88	9:30203
4770289	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770289	MN -88	9:31395
4770290	NTIS (US Sales Only), PC A02/MF A01	DE84770290	MN -88	9:30204
4770291	NTIS (US Sales Only), PC A02/MF A01	DE84770291	MN -88	9:30205
4770292	NTIS (US Sales Only), PC A02/MF A01	DE84770292	MN -88	9:30206
4770293	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770293	MN -88	9:30207
4770294	NTIS (US Sales Only), PC A02/MF A01	DE84770294	MN -88	9:30208
4770295	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770295	MN -88	9:31462
4770296	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770296	MN -88	9:30187
4770297	NTIS (US Sales Only), PC A02/MF A01	DE84770297	MN -88	9:30209
4770298	NTIS (US Sales Only), PC A02/MF A01	DE84770298	MN -88	9:31463
4770299	NTIS (US Sales Only), PC A02/MF A01	DE84770299	MN -88	9:31396
4770300	NTIS (US Sales Only), PC A02/MF A01	DE84770300	MN -88	9:31464
4770301	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770301	MN -88	9:31465
4770302	NTIS (US Sales Only), PC A02/MF A01	DE84770302	MN -88	9:31397
4770303	NTIS (US Sales Only), PC A09/MF A01; 1	DE84770303	MN -92a	9:30231
4770304	NTIS (US Sales Only), PC A08/MF A01; 1	DE84770304	MN -90c	9:30145
4770305	NTIS (US Sales Only), PC A07/MF A01; 1	DE84770305	MN -90c	9:30146
4770306	NTIS (US Sales Only), PC A06/MF A01; 1	DE84770306	MN -90c	9:30174
4770307	NTIS (US Sales Only), PC A08/MF A01; 1	DE84770307	MN -92	9:30235
4770308	NTIS (US Sales Only), PC A09/MF A01; 1	DE84770308	MN -90	9:30147
4770309	NTIS (US Sales Only), PC A07/MF A01; 1	DE84770309	MN -90c	9:30148
4770310	NTIS (US Sales Only), PC A08/MF A01; 1	DE84770310	MN -90c	9:30149
4770311	NTIS (US Sales Only), PC A07/MF A01	DE84770311	MN -92	9:30263
4770312	NTIS (US Sales Only), PC A06/MF A01; 1	DE84770312	MN -11	9:30175
4770313	NTIS (US Sales Only), PC A08/MF A01; 1	DE84770313	MN -04	9:30466
4770314	NTIS (US Sales Only), PC A06/MF A01	DE84770314	MN -04	9:30467
4770315	NTIS (US Sales Only), PC A10/MF A01; 1	DE84770315	MN -04	9:30468
4770316	NTIS (US Sales Only), PC A08/MF A01	DE84770316	MN -92	9:30232
4770317	NTIS (US Sales Only), PC A10/MF A01; 1	DE84770317	MN -04	9:30469
4770318	NTIS (US Sales Only), PC A09/MF A01; 1	DE84770318	MN -04	9:30470
4770319	NTIS (US Sales Only), PC A07/MF A01; 1	DE84770319	MN -92	9:30236
4770320	NTIS (US Sales Only), PC A02/MF A01	DE84770320	MN -38	9:31092
4770321	NTIS (US Sales Only), PC A02/MF A01; 1	DE84770321	MN -13	9:31023
4770322	NTIS (US Sales Only), PC A04/MF A01; 1	DE84770322	MN -48	9:31810
4901040	NTIS, PC A03/MF A01; 1	DE84901040	MN -11	9:31831

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4901066	NTIS, PC A06/MF A01; 1	DE84901066	MN -96	9:30471
4901154	Bureau of Economic Geology, Univ. of Texas, Austin, TX 78712	TI84901154	MN -90	9:30188
4901166	Bureau of Economic Geology, Univ. of Texas, Austin, TX 78712	TI84901166	MN -11	9:31708
4901167	Univ. of Texas, Austin, TX 87812	TI84901167	MN -11	9:30277
4901170	Bureau of Economic Geology, Univ. of Texas, Austin, TX 78712	TI84901170	MN -51	9:30278
4901230	NTIS (US Sales Only), PC A05/MF A01	DE84901230	MN -59a	9:30559
NRPB-R-				
41	HMSO, National Radiological Protection Board, Harwell, Didcot, England	TI84901059	ND -41	9:31791
NUREG-				
0698-Rev.2	NTIS, PC A03/MF A01 - GPO* $3.75	DE84901044	MN -78	9:30734
0776-Suppl.6	NTIS, PC A05/MF A01 - GPO*	DE84900962	MN -78	9:30883
NUREG/CP-				
0047	NTIS, PC A17/MF A01; 1 - GPO* $8.00	DE84900042	MN -78	9:30884
0048-Vol.1	NTIS MF A01; 2 - GPO* $12.00	DE84900510	MN -78	9:30885
0048-Vol.6	NTIS, PC A10/MF A01; 1 - GPO*	DE84900650	MN -78	9:30915
0049	NTIS, PC A22/MF A01; 1 - GPO* $9.50	DE84901063	MN -85	9:30304
0052	NTIS, PC A23/MF A01; 1 - GPO* $10.00	DE84901252	MN -70	9:30345
NUREG/CR-				
2679-Vol.24	NTIS, PC A10/MF A01 - GPO (GPO Dep.)	DE84012852	MN -80	9:30930
3200-Vol.4	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011575	MN -2	9:31423
3307-Vol.4	NTIS, PC A03/MF A01 - GPO $3.75 (GPO Dep.)	DE84013529	MN -80	9:30931
3329-Vol.4	NTIS, PC A04/MF A01; 1 - GPO (GPO Dep.)	DE84011478	MN -78	9:30932
3360	NTIS PC E04 - GPO (GPO Dep.)	DE84010550	MN -80	9:30797
3496	NTIS, PC A03/MF A01 - GPO $3.75 (GPO Dep.)	DE84007680	MN -78	9:30346
3518-Vol.1	NTIS, PC A03/MF A01; 1 - GPO (GPO Dep.)	DE84012380	MN -80	9:30933
3547	NTIS, PC A08/MF A01; 1 - GPO (GPO Dep.)	DE84009019	MN -80	9:30934
3604	NTIS, PC A14/MF A01; 1 - GPO $7.50 (GPO Dep.)	DE84012736	MN -80	9:30691
3604	NTIS, PC A14; 3 - GPO $7.50 (GPO Dep.)	DE84012854	MN -80	9:30811
3608	NTIS PC E05/MF A01; 1 - GPO (GPO Dep.)	DE84011863	MN -78	9:30935
3619	NTIS, PC A03/MF A01 - GPO* $4.00	DE84901130	MN -15	9:30405
3627	NTIS, PC A13/MF A01; 1 - GPO (GPO Dep.)	DE84009923	MN -78	9:30936
3653	NTIS, PC A08/MF A01; 1 - GPO (GPO Dep.)	DE84012929	MN -78	9:30937
3669	NTIS, PC A03/MF A01; 1 - GPO $4.00 (GPO Dep.)	DE84011864	MN -78	9:30938
3670	NTIS, PC A08/MF A01; 1 - GPO (GPO Dep.)	DE84012160	MN -11	9:31644
3673	NTIS, PC A12/MF A01; 1 - GPO (GPO Dep.)	DE84012735	MN -80	9:30939
3684	NTIS, PC A04/MF A01 - GPO (GPO Dep.)	DE84011479	MN -80	9:30940
3722	NTIS, PC A04/MF A01; 1 - GPO (GPO Dep.)	DE84011183	MN -80	9:30941
3726	NTIS, PC A07/MF A01; 1 - GPO $5.50 (GPO Dep.)	DE84012058	MN -80	9:30692
3743	NTIS, PC A03/MF A01 - GPO $3.50 (GPO Dep.)	DE84012818	MN -80	9:30812
3749	NTIS (US Sales Only), PC A06/MF A01; 1 - GPO $5.00 (GPO Dep.)	DE84012162	MN -78	9:30942
3771	NTIS, PC A06/MF A01; 1 - GPO (GPO Dep.)	DE84012494	MN -80	9:30813
3785	NTIS, PC A03/MF A01; 1 - GPO $4.50 (GPO Dep.)	DE84012815	MN -80	9:30943
3797	NTIS, PC A03/MF A01; 1 - GPO $3.75 (GPO Dep.)	DE84012081	MN -70	9:30387
3805	NTIS, PC A17/MF A01; 1 - GPO* $8.50	DE84901344	MN -80	9:31832
NVO-				
196-24-Rev.4	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84013381	STD -70	9:30347
281	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84013372	MN -70	9:31694
NYSERDA-				
83-16	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223	TI84901159	MN -60	9:30594
84-6	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223	TI84901160	MN -97b	9:30608
84-9	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223	TI84901062	MN -94	9:30980
84-10	New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, NY 12223	TI84901266	MN -63	9:30513
OEFZS-				
4245	NTIS (US Sales Only), PC A02/MF A01	DE84701856	MN -41	9:31741
4246	NTIS (US Sales Only), PC A02/MF A01	DE84701860	MN -23	9:30417
OH-				
82-37-K	NTIS (US Sales Only), PC A03/MF A01	DE84701876	MN -80	9:30758
82-144-K	NTIS (US Sales Only), PC A03/MF A01	DE84701858	MN -41	9:30348
82-450-K	NTIS (US Sales Only), PC A02/MF A01	DE84701836	MN -25	9:31201
ORAU/IEA-				
84-2(M)	NTIS, PC A07/MF A01 (GPO Dep.)	DE84012891	MN -78	9:30944
84-5(M)	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012271	MN -80	9:30945
ORNL/Sub-				
82-52845/ 1	*See* NUREG/CR-3771	DE84012494	MN -80	9:30813
ORNL/TM-				
8796/ V4	*See* NUREG/CR-3200-Vol.4	DE84011575	MN -2	9:31423
8916	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84011826	MN -90d	9:30150
8919	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84012856	MN -11	9:31696
9174	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012022	MN -80	9:30852
ORNL-tr-				
5115	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012865	MN -34D	9:32339
5117	NTIS, PC A08/MF A01; 1 (GPO Dep.)	DE84012867	MN -25	9:31235
5118	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012870	MN -20	9:32385
5122	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012868	MN -70B	9:30364
5123	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012862	MN -70	9:30363
5126	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012989	MN -20a	9:32390

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5127	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012990	MN -20a	9:32337
5128	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012994	MN -20	9:32336
5129	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012984	MN -20a	9:32338
OTA-C-				
10	NTIS, PC A05/MF A01; 1	DE84901039	MN -25	9:31002
10-Vol.1-Summ.	NTIS, PC A05/MF A01; 1	DE84901036	MN -25	9:31003
P-				
300-83-008	California Energy Commission, 1516 9th Street, MS-13, Sacramento, CA 95814	TI84901067	MN -92a	9:30248
300-83-009	California Energy Commission, 1516 9th Street, MS-13, Sacramento, CA 95814	TI84901068	MN -92a	9:30249
500-83-12	California Energy Commission, 1516 Ninth St.-MS-13, Sacramento, CA 95816	TI84901069	ND -66g	9:30592
500-83-017	California Energy Commission, 1516 9th Street, MS-13, Sacramento, CA 95814	TI84901070	ND -60	9:30601
PATENTS-US-	(US: Commissioner of Patents, Washington, D.C. 20231, USA, $1.00 per copy. Government Patent Applications available from NTIS)			
3,492,160				9:30989
4,418,989				9:31413
4,422,044				9:31452
4,426,055				9:31450
4,426,550				9:31404
4,426,620				9:31451
PB-				
83-141564	NTIS, PC A07/MF A01; 1	TI84901186	MN -11	9:31709
84-120005	NTIS, PC A10/MF A01	TI84901195	MN -11	9:31710
84-121383	NTIS MF A01			9:30999
84-141589	NTIS, PC A03/MF A01			9:30210
84-141878	NTIS, PC A04/MF A01			9:31858
84-143460	NTIS, PC A15/MF A01			9:30211
84-144138	NTIS, PC A21/MF A01			9:31701
84-144476	NTIS PC E08/MF E01			9:30154
84-144955	NTIS, PC A03/MF A01			9:31711
84-145473	NTIS, PC A02/MF A01			9:31821
84-145762	NTIS, PC A04/MF A01			9:30349
84-145804	NTIS, PC A04/MF A01			9:30237
84-145812	NTIS, PC A02/MF A01			9:31797
84-145820	NTIS, PC A05/MF A01			9:30165
84-145895	NTIS, PC A11/MF A01			9:31678
84-145903	NTIS, PC A06/MF A01			9:31679
84-145911	NTIS, PC A02/MF A01			9:31680
84-146190	NTIS, PC A04/MF A01			9:31004
84-146216	NTIS, PC A04/MF A01			9:31005
84-146919	NTIS, PC A02/MF A01			9:31655
84-146943	NTIS, PC A02/MF A01			9:31656
84-147362	NTIS PC E10/MF E01			9:31323
84-148113	NTIS, PC A04/MF A01			9:31657
84-148196	NTIS, PC A06/MF A01			9:31859
84-148295	NTIS, PC A12/MF A01			9:31681
84-148360	NTIS, PC A06/MF A01			9:31720
84-148378	NTIS, PC A02/MF A01			9:30223
84-148386	NTIS, PC A03/MF A01			9:31658
84-148501	NTIS, PC A02/MF A01			9:31659
84-148592	NTIS, PC A11/MF A01			9:31811
84-148634	NTIS, PC A05/MF A01			9:31712
84-148790	NTIS, PC A08/MF A01			9:31833
84-148865	NTIS, PC A07/MF A01			9:30472
84-149095	NTIS, PC A03/MF A01			9:31713
84-149145	NTIS, PC A04/MF A01			9:31691
84-149178	NTIS, PC A03/MF A01			9:30238
84-149202	NTIS PC E04/MF E04			9:31822
84-149277	NTIS, PC A02/MF A01			9:31714
84-149376	NTIS, PC A03/MF A01			9:30543
84-149384	NTIS, PC A05/MF A01			9:31692
84-149558	NTIS, PC A02/MF A01			9:31695
84-149616	NTIS PC E03/MF E01			9:31042
84-149798	NTIS, PC A05/MF A01			9:31819
84-150051	NTIS, PC A03/MF A01			9:31812
84-150275	NTIS, PC A04/MF A01			9:31006
84-150457	NTIS, PC A02/MF A01			9:31820
84-150549	NTIS, PC A04/MF A01			9:31813
84-151877	Pub. in Proceedings of Int. Conf. Laser Spectroscopy (6th), Interlaken, Switzerland, June 27-July 1, 1983, p229-2321983			9:31957
84-152719	NTIS, PC A14/MF A01			9:31325
84-152768	NTIS, PC A23/MF A01			9:31702
84-152875	NTIS, PC A02/MF A01			9:31703
84-152966	NTIS, PC A02/MF A01			9:31686
84-155845	NTIS, PC A19/MF A01			9:31660
84-158336	NTIS, PC A05/MF A01			9:30151
PFC/CP-				
84-4	*See* DOE/ET/51013-117	DE84010308	STD -20g	9:32306
PIFR-				
1100	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84012402	MN -20	9:32362

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PNL-				
3857	NTIS, PC A04/MF A01 (GPO Dep.)	DE84012337	MN -66	9:30586
4705-4	*See* NUREG/CR-3307-Vol.4	DE84013529	MN -80	9:30931
4765	*See* NUREG/CR-3726	DE84012058	MN -80	9:30692
4869	NTIS, PC A05/MF A01 (GPO Dep.)	DE84012998	MN -11	9:31661
4895	NTIS, PC A05/MF A01; 1 (GPO Dep.)	DE84011790	MN -60	9:30602
5003	*See* NUREG/CR-3669	DE84011864	MN -78	9:30938
5006	*See* NUREG/CR-3670	DE84012160	MN -11	9:31644
5008	NTIS, PC A04/MF A01 (GPO Dep.)	DE84012824	MN -95	9:31093
5024	NTIS, PC A04//MF A01 (GPO Dep.)	DE84013164	MN -60	9:30603
5028	*See* NUREG/CR-3797	DE84012081	MN -70	9:30387
5062	*See* NUREG/CR-3743	DE84012818	MN -80	9:30812
5066	*See* NUREG/CR-3749	DE84012162	MN -78	9:30942
5087	*See* NUREG/CR-3785	DE84012815	MN -80	9:30943
5105	*See* DOE/UMT-0217	DE84013323	MN -70A	9:30323
5108	NTIS, PC A03/MF A01 (GPO Dep.)	DE84013311	MN -86	9:30350
PNL-SA-				
4868-Rev.5	NTIS, PC A08/MF A01 (GPO Dep.)	DE84011547	MN -46	9:31398
11768	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011871	MN -34A	9:31958
11792	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011903	MN -41	9:31676
11833	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011873	MN -11	9:31814
12192	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011899	MN -38	9:31424
12197	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011905	MN -94a	9:31419
12261	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011878	MN -63	9:30506
PPPL-				
2099	NTIS, PC A05/MF A01 (GPO Dep.)	DE84013078	STD -20d	9:32363
2101	NTIS, PC A04/MF A01; 1	DE84013098	STD -20f	9:32364
2109	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84013051	STD -20f	9:32318
PR-CMa-				
60	*See* AECL-7692	DE84701913	MN -2	9:31330
R-				
96	*See* PB-84-145812			9:31797
97	*See* PB-84-145820			9:30165
REC-ERC-				
82-11	*See* PB-84-152719			9:31325
RFP-				
3564	NTIS, PC A04/MF A01 (GPO Dep.)	DE84013191	STD -60	9:30604
RISO-M-				
2379	NTIS (US Sales Only), PC A04/MF A01; 1	DE84770254	MN -13	9:31748
2411	NTIS (US Sales Only), PC A02/MF A01	DE84751455	MN -60	9:30596
RISO-R-				
491	NTIS (US Sales Only), PC A04/MF A01	DE84701752	MN -2	9:32399
RL-				
82-085	NTIS (US Sales Only), PC A02/MF A01	DE84701889	MN -37	9:31561
83-010	NTIS (US Sales Only), PC A08/MF A01	DE84780163	MN -34	9:31628
83-043	NTIS (US Sales Only), PC A17/MF A01	DE84701782	MN -20	9:31409
83-055	NTIS (US Sales Only), PC A02/MF A01	DE84701818	MN -46	9:32249
83-056	NTIS (US Sales Only), PC A02/MF A01	DE84701797	MN -34D	9:32022
83-059	NTIS (US Sales Only), PC A02/MF A01	DE84701805	MN -34D	9:31996
83-060	NTIS (US Sales Only), PC A02/MF A01	DE84701801	MN -34D	9:32054
83-061	NTIS (US Sales Only), PC A02/MF A01	DE84701788	MN -34D	9:32023
83-069	NTIS (US Sales Only), PC A05/MF A01	DE84780162	MN -25	9:32298
83-073	NTIS (US Sales Only), PC A03/MF A01	DE84701789	MN -34D	9:32024
83-079	NTIS (US Sales Only), PC A02/MF A01	DE84701711	MN -34B	9:31871
83-094	NTIS (US Sales Only), PC A03/MF A01	DE84701890	MN -37	9:31562
SAI-				
84-1606/ PRI-78	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012795	STD -20g	9:32319
84-3028/ PRI-73	NTIS, PC A02/MF A01 (GPO Dep.)	DE84008940	STD -20g	9:32320
SAND-				
82-0904-Vol.24	*See* NUREG/CR-2679-Vol.24	DE84012852	MN -80	9:30930
82-2714	NTIS, PC A99/MF A01; 1 (GPO Dep.)	DE84012482	MN -70	9:30351
82-2717	NTIS, PC A15/MF A01; 1 (GPO Dep.)	DE84011160	STD -70A	9:30352
83-1054	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84013312	MN -25	9:30440
83-1166	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012935	STD -70	9:30353
83-1171-Vol.4	*See* NUREG/CR-3329-Vol.4	DE84011478	MN -78	9:30932
83-1808	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84012489	MN -70	9:30354
83-1949C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84009921	MN -25	9:31232
83-2037	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84012884	MN -70	9:30355
83-2122	NTIS, PC A18/MF A01; 1 (GPO Dep.)	DE84012873	MN -70	9:30356
83-2238	*See* NUREG/CR-3547	DE84009019	MN -80	9:30934
83-2507	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012916	MN -70	9:30357
83-2549	*See* NUREG/CR-3608	DE84011863	MN -78	9:30935
83-2573	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012136	MN -25	9:31239
83-2614C	NTIS, PC AO2/MF A01 (GPO Dep.)	DE84011684	MN -20	9:32365
83-2641C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012235	MN -20	9:32321
83-2677C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84006290	MN -78	9:30946
83-7131	NTIS, PC A09/MF A01; 1 (GPO Dep.)	DE84012874	STD -70	9:30358
83-7463	*See* NUREG/CR-3653	DE84012929	MN -78	9:30937
83-8236	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012224	MN -20a	9:32322
84-0064C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84006963	MN -38	9:31425
84-0095C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011191	MN -28	9:31495
84-0140	*See* NUREG/CR-3684	DE84011479	MN -80	9:30940
84-0169-Vol.8-No.1	NTIS, PC A03/MF A01 (GPO Dep.)	DE84012270	MN -2	9:31363
84-0171C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012766	MN -78	9:30947
84-0178	*See* NUREG/CR-3673	DE84012735	MN -80	9:30939

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84-0293	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012915	MN -32	9:32418
84-0378C	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011683	MN -25	9:31613
84-0448	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012920	MN -32	9:32419
84-0565C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012654	MN -32	9:31426
84-0570	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012957	MN -34	9:32250
84-0579C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84009448	MN -38	9:30514
84-0607	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84013319	STD -90d	9:30152
84-0716C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011482	MN -94cb	9:30981
84-0724C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012653	MN -70	9:31266
84-0805C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012280	MN -80	9:30948
84-0904C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012651	MN -78	9:30949
84-0908	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012826	MN -92a	9:30258
84-0924C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011257	MN -60	9:30605
84-0986C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011485	MN -70	9:30359
84-1039C	NTIS, PC A02; 3 (GPO Dep.)	DE84012764	MN -80	9:30950
84-1040C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012765	MN -80	9:30951
84-1063C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012233	MN -13	9:32440
84-1088C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012236	MN -91	9:30271
84-1095C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012655	MN -80	9:30952
84-1127C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012237	MN -38	9:31399
84-1166C	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012549	MN -78	9:30953
84-1173C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012811	MN -4	9:31315
84-7105	NTIS, PC A04/MF A01; 1 (GPO Dep.)	DE84013192	MN -94ca	9:30982
84-7120C	NTIS, PC A02/MF A01 (GPO Dep.)	DE84009492	MN -38	9:31433
SERI/PR-				
211-2236	NTIS, PC A04/MF A01 (GPO Dep.)	DE84004493	STD -63	9:30515
SERI/TR-				
231-2159	NTIS, PC A06/MF A01; 1 (GPO Dep.)	DE84004487	STD -61A	9:30473
SERP-E-				
142	*See* IFVE-OEF-83-109	DE84701802	MN -34D	9:31986
SLAC/AP-				
16	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84012498	MN -28	9:31478
24	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012772	MN -34D	9:31496
SLAC-CN-				
252	NTIS, PC A03/MF A01; 1 (GPO Dep.)	DE84011771	MN -28	9:31497
261	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011770	MN -28	9:31498
262	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84011812	MN -28	9:31516
270	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012906	MN -28	9:31499
SLAC-PUB-				
2925	NTIS, PC A03; 3 (GPO Dep.)	DE84009710	MN -28	9:31500
3311	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012221	MN -34D	9:31517
3312	NTIS, PC A02/MF A01; 1 (GPO Dep.)	DE84012222	MN -34D	9:31997
3323	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012512	MN -34D	9:31998
3330	NTIS, PC A02/MF A01 (GPO Dep.)	DE84011196	MN -28	9:31479
3332	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012513	MN -34D	9:32420
3335	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012892	MN -34D	9:31999
3336	NTIS, PC A02/MF A01 (GPO Dep.)	DE84012375	MN -34D	9:32000
3345	NTIS, PC A02; 3 (GPO Dep.)	DE84012228	MN -34D	9:32001
SRD-R-				
266	NTIS (US Sales Only), PC A03/MF A01	DE84701719	MN -71	9:31400
ST-				
109/ 83	*See* OEFZS-4245	DE84701856	MN -41	9:31741
STI/PUB-				
649-Vol.3	UNIPUB, PO Box 433, Murray Hill Station, New York, NY 10157	TI84012209	ND -70	9:30360
STMPO-				
055	*See* DOE/SF/10501-010	DE84008898	MN -62	9:30534
059	*See* DOE/SF/10501-012	DE84008956	MN -62	9:30535
065	*See* DOE/SF/00700-T7	DE84011307	MN -62	9:30533
066	*See* DOE/SF/00700-T6	DE84012767	MN -62	9:30532
287	*See* DOE/ET/21007-5	DE84011221	MN -62	9:30531
295	*See* DOE/SF/10539-08	DE84011434	MN -62	9:30536
297	*See* DOE/SF/10539-10	DE84011437	MN -62	9:30537
564	*See* DOE/SF/10539-14	DE84012608	MN -62	9:30538
565	*See* DOE/SF/10539-15	DE84012980	MN -62	9:30539
568	*See* DOE/SF/10539-18	DE84012462	MN -62	9:30540
TPR-NS-				
25-No.2	GPO, $6.50	TI84006789	ND -80	9:30954
TR-				
7	*See* AD-A-137089/9			9:31242
20	*See* AD-A-136955/2			9:31241
40-ONR	*See* AD-A-136991/7			9:31327
TRI-PP-				
82-20	NTIS (US Sales Only), PC A02/MF A01	DE84701811	MN -34D	9:32002
82-22	NTIS (US Sales Only), PC A03/MF A01	DE84701806	MN -34D	9:31959
82-23	NTIS (US Sales Only), PC A02/MF A01	DE84701808	MN -34D	9:31960
82-25	NTIS (US Sales Only), PC A02/MF A01	DE84701798	MN -34D	9:32025
82-27	NTIS (US Sales Only), PC A02/MF A01	DE84701812	MN -34D	9:32003
82-30	NTIS (US Sales Only), PC A02/MF A01	DE84701790	MN -34D	9:32026
82-33	NTIS (US Sales Only), PC A02/MF A01	DE84701775	MN -34A	9:31961
82-34	NTIS (US Sales Only), PC A02/MF A01	DE84701796	MN -34D	9:32027
82-35	NTIS (US Sales Only), PC A02/MF A01	DE84701791	MN -34D	9:32028
82-36	NTIS (US Sales Only), PC A02/MF A01	DE84701792	MN -34D	9:32029
82-37	NTIS (US Sales Only), PC A02/MF A01	DE84701863	MN -28	9:31518
82-38	NTIS (US Sales Only), PC A02/MF A01	DE84701891	MN -37	9:31563

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82-39	NTIS (US Sales Only), PC A02/MF A01	DE84701825	MN -34C	9:32076
82-41	NTIS (US Sales Only), PC A02/MF A01	DE84701814	MN -34D	9:32004
82-42	NTIS (US Sales Only), PC A02/MF A01	DE84701815	MN -34D	9:32005
82-43	NTIS (US Sales Only), PC A02/MF A01	DE84701807	MN -34D	9:32006
82-45	NTIS (US Sales Only), PC A02/MF A01	DE84701754	MN -34D	9:32281
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RA Report analytic
B Book
BA Book analytic
P Patent
E Engineering materials
D Thesis or dissertation
TG Translation (general)
TA Translation (analytic)

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TC Trucial Oman
TD Chad
TG Togo
TH Thailand
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TO Tonga
TR Turkey
TT Trinidad and Tobago
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TZ United Republic of Tanzania

UA Ukrainian Soviet Socialist Republic (Ukrainian SSR)
UG Uganda
US United States of America (USA)
UY Uruguay

VA Holy See
VD Democratic Republic of Vietnam
VE Venezuela
VS Republic of Vietnam

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YE Yemen
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